

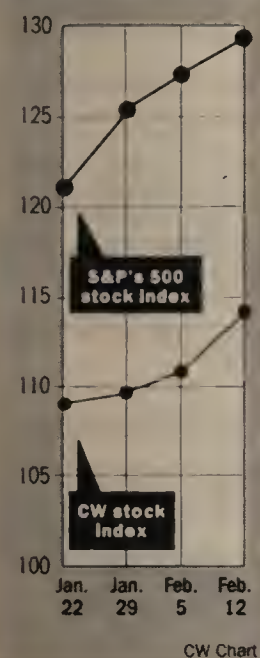
COMPUTERWORLD

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FEBRUARY 17, 1986

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Telecommuting gives business a boost/51

TOP OF THE NEWS

Control Data's worst financial performance in history produced a greater than expected loss. **Page 114.**

Apollo Computer will fire its volley in the workstation wars this week by re-vamping its entire workstation line, starting with a system that brings the performance of its previous high-end systems down to the personal computer price range. **Page 2.**

Tandem will unveil in April the first fully Cobol 85-compatible compiler. **Page 29.**

GATX Corp. networks micros through its existing Centrex service. **Page 19.**

Compaq Computer puts its laptop technology on hold and instead will introduce next week a lighter and smaller model of its tried-and-proven Portable PC. A laptop is at least a year away, said Mike Swavely, vice-president of marketing. "The screen technology is still not there."

ITT canceled plans last week to bring its System 12 digital switch to the U.S., after delays in converting its European switch to U.S. standards. The company will lay off 1,600 workers and post a fourth-quarter loss as a result. According to ITT spokesman David Allen, "What changed our view of the market was that the primary customers, the old Bell operating companies, started converting to digital equipment at a much faster rate than anticipated. ... The System 12 would not have been ready until 1987 or 1988."

Software AG of North America will release this year DEC VAX/VMS versions of its Super Natural, Net-Work, Predict and Natural Security mainframe packages, company officials announced last week. Software AG said it hopes that sales in the DEC environment will account for 20% of its revenue within the

See **NEWS** page 7

Staff suspended after \$2 billion transfer slipup

By **Jeffry Beeler**

SAN FRANCISCO — A federal institution that provides wholesale banking services in nine Western states last week blamed human carelessness for a recent wire transfer error that temporarily bestowed a \$2 billion windfall on 19 of the organization's customers.

The accident, described as "unprecedented," occurred at the Federal Reserve Bank's Western district office in San Francisco and followed a test of a new communications software package that the office intends to use with its electronic funds

See **STAFF** page 9

Unbundling move shocks Sperry market

By **Clinton Wilder**

BLUE BELL, Pa. — Sperry Corp. confirmed last week that it will charge operating system license fees to users who buy the company's large systems from other sources. The policy is likely to turn buyers away from third-party suppliers and sharply reduce the resale value of used equipment, according to dealers and users.

"We are going to charge for operating systems for people who buy from third-party sources," said Sperry spokesman Michael Maynard. He declined to comment on the details of or motivation behind the pol-

See **UNBUNDLING** page 6

IBM realigns mainframes to spur sales

Price cuts seen as response to DP budgets, competition

By **James Connolly**

In an apparent effort to cope with tight DP budgets and the threat of supermini-computer competitors, IBM last week realigned the bulk of its mainframe product line.

In a series of announcements, IBM:

- Introduced two intermediate uniprocessors for the 3090 family.

- Added memory and slashed prices on the 3090 line.

- Replaced the previous 4381 series with four new models.

- Eliminated the 4341 line.

- Cut prices on the 3080 series.

While the additions to the 3090 and 4381 families were not unexpected, many IBM watchers were surprised by the announcement of a 10% price cut for the two previous 3090s, the 6-month-old Model 200 and the yet-to-ship Model 400. They were also surprised by the price/performance improvements in the 4381 line. Analysts saw the cuts, by which a Model 200 now costs \$4.5 million and a Model 400 costs \$8.5 million, as IBM's response to tight DP budgets.

"IBM is trying to stir up some interest in a lackluster market," said International Data Corp. analyst Frank Gens.

The price cuts were announced amid speculation by analysts that sales of the Model 200 had peaked by the end of last year and the revelation by IBM that its domestic CPU revenue slipped by \$400 million from 1984 to 1985.

The 3090 uniprocessors, known as the Model 150 and Model 180, are targeted at

See **IBM** page 4

CW EXCLUSIVE

Net values: Users watch ISDN, opt for current solutions

By **Elisabeth Horwitt**

"I'll be like mother and the flag, if they can pull it off," one telecommunications manager says of the Integrated Services Digital Network, the emerging communications standard that promises business users far greater freedom of choice regarding the delivery of information services.

ISDN, proponents claim, will allow users to transmit voice, data, text and video over the same digital pipeline, reconfigure bandwidth at the touch of a button and deliver data and services to any terminal without the need for costly protocol conversion.

Two major banks, ideal customers for the amenities of ISDN, say they believe

that the technology is the solution for the 1990s. In the meantime, they will plan their communications needs around proven technologies such as T1 networks.

Reiterating his mother and flag enthusiasm, Joseph P. Fornieri says, "ISDN sounds like the ultimate flexibility all the way to the terminal — plug in anything, go anywhere." But in his next breath, this vice-president and manager of the Com-Net Systems Division of Chase Lincoln First Bank NA of Rochester, N.Y., reflects the concerns of many telecommunications managers: "We won't be among the first integrators. Let the other

guys take the risks."

The telecommunications industry has been doing a lot of ISDN flag-waving in recent months. Carriers are keeping the public aware of exactly how many new digital switches they have installed and how many additional miles of fiber-optic cable they have laid down. Equipment vendors are racing to implement ISDN compatibility in their central office switches. A growing number of vendors are scheduling ISDN field trials at business sites.

Yet corporate telecommunications managers have maintained a show-me

See **NET** page 12

Chase's Fornieri

NEWS

Workstation vendors clash for dominance in unsettled market

Only two big winners in three-tier market

By Rosemary Hamilton

No clear winners in the engineering workstation war will emerge for at least a year, but analysts predict that the biggest share of the market will be divided between two major players, with two earlier combatants holding onto a smaller, but still sizable, chunk.

This week Apollo Computer, Inc., the Chelmsford, Mass.-based engineering workstation vendor, will roll out nothing less than "an entirely new computing environment." The 5-year-old company has a great deal riding on the generation of products as it struggles to retain its prominence in a market that it once dominated.

Over the past few months, Apollo has seen its position challenged by rivals such as Digital Equipment Corp., IBM and Sun Microsystems, Inc. in a bitter battle for shares of a market whose 1985 sales totaled approximately \$700 million.

Analysts point to DEC and IBM as the big winners in the workstation market, closely followed by Apollo and Sun. Rounding out the field will be an assortment of mini vendors, small specialty firms and a handful of ambitious personal computer companies.

However, no final resolution will be reached for at least another year, analysts say. In the meantime, users can expect widespread confusion as vendors promote their wares and deride the competition. In the last two weeks of January alone, DEC, Sun and IBM all made major product announcements, and the competition clamored for attention by taking potshots at the offerings.

"We're trying to keep up," said Richard Cheever, a scientific and engineering consultant in the Data Systems division of Martin Marietta Corp., where "dozens" of Apollo and Sun workstations are installed. "Right now we want to hold off and take a look. We prefer to test the products ourselves, anyway," he said.

Other users agree

Cheever's sentiments were echoed by other users. "We don't believe anything a salesman or the company tells us," said David Tripp, a systems engineer at Link, Inc., a subsidiary of Singer, Inc., which makes flight simulation systems for the military and commercial airlines. "We put the equipment through tests."

Thomas Lasinski, workstation subsystems manager at the National Aeronautics and Space Administration's Ames Research Center, expressed sympathy to anyone currently in the market for a workstation. "I can understand why anyone would have a hard time sorting it out," he said. "I'm fortunate in that I have very specific requirements, which makes my

job easier." Lasinski works on a Silicon Graphics, Inc. Iris 2400 to transform advanced mathematical solutions into graphical data. "All I can advise is to try to narrowly define your requirements and then try to ferret out the machine."

"When vendors tell you they're better, you have no idea what that means in terms of the whole picture," said Charles Foundry, president of the research firm Daratech, Inc. in Cambridge, Mass. "It's like owning a fruit store and saying your pears are 25% better. Fine, but what does that mean for the whole fruit store? Besides, each buyer has his own idea of what's important, and he weighs things differently. And we're talking about an intelligent buying public here."

The confusion and caution found in the workstation arena today are not unusual for any young, rapidly growing market. Once primarily an expensive stand-alone tool for computer-aided design (CAD), workstation prices are dropping and performance is increasing, prompting independent software developers to write general-interest applications, including data management, word processing and spreadsheets.

As it stands now, there are three main segments of the market: the high end, where systems cost \$50,000 or more and are used for graphics-intensive work like solids modeling and flight simulation; the mid-range, where systems are used for CAD and electronic design and sell for between \$25,000 and \$50,000; and the low end, where systems cost less than \$25,000 and are used for technical publishing as well as CAD.

There is plenty of overlap, as well. Artificial intelligence development work is done on personal computers, low-end workstations or high-end workstations, depending on the complexity of the task. Word processing and spreadsheet analysis, generally considered personal computer applications, can be done on mid-range or high-end machines with software packages from such vendors as Applix, Inc.

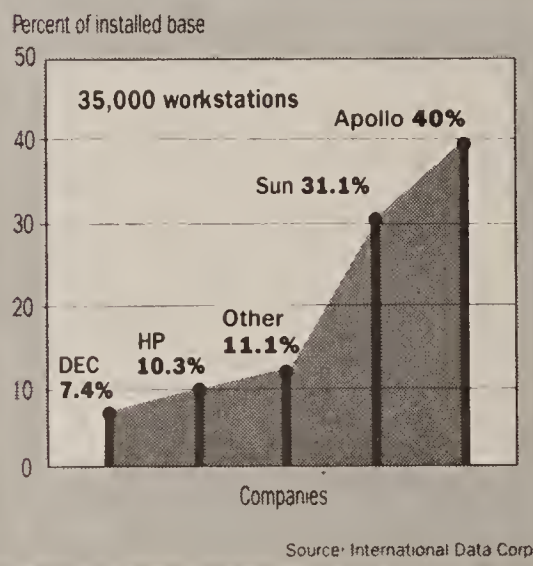
When the warring eventually calms down, most analysts see the market shaping up with DEC, IBM, Apollo and Sun splitting about 80%. DEC, of course, can build on its large installed base within the engineering world. Not only does it have a loyal following of VMS users, but it also has made a commitment to Unix, which has quickly become the foundation for building workstation operating systems.

IBM does not have an established relationship with the engineering community, but it has vast resources to play catch-up. And then there is its marketing savvy. Foundry at Daratech, for instance, expects IBM to make a real push in the retail channels with its RT Personal Computer — which now has an entry price of \$16,485. This strategy would likely force the prices of workstations down to a point

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ANALYSIS

Engineering workstation installed base, 1986



MITCHELL J. HAYES

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ADR AND AMERITECH. A NEW CHAPTER IN THE HISTORY OF SOFTWARE.



*"And then back in 1986,
ADR became part of Ameritech."*

When history is finally written, of all man's inventions the computer will perhaps be the most important. Yet experts agree future advances in computer technology will come not from new hardware but from better software.

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NEWS

IBM directs 3090s at high-growth customers

By James Connolly

RYE BROOK, N.Y. — The two uni-processor 3090 mainframes announced by IBM last week are targeted at the company's current 3083 customers.

The 3090 Model 150 performs an estimated 9.2 to 10.9 million instructions per second (MIPS), and the Model 180, has an estimated rating of 14.2 to 17.6 MIPS. The high end of those ranges are for scientific applications, with commercial applications reflected at the low end.

The 150 provides 32M to 64M bytes of memory and 16 to 24 channels and is scheduled for delivery in October at \$1.7 million for a 32M-byte system.

The Model 180 features the same memory capacity and eight additional channels and is scheduled for April delivery at \$2.6 million for a 32M-byte system. The primary difference between the 150 and the 180 is a 256M-byte expanded memory option on the 180.

IBM also announced

■ An average price cut of 10% for the 3090 Models 200 and 400.

■ A four-processor Model 400 as a system rather than as just an upgrade from the dual-processor Model 200 when the 400 is delivered in late 1986.

■ A doubling of the expanded memory feature on the Model 200 and Model 400, with the 200 handling up to 256M bytes of expanded storage and the 400 handling up to 512M bytes of expanded storage.

■ A lower cost model of the IBM

IBM's 3090 processors				
	Model 150	Model 180	Model 200	Model 400
Processors	1	1	2	4
MIPS ¹	9.2-10.9	14.2-17.6	29.3	52.7
Machine Cycle Time (Nsec)	18.5	18.5	18.5	18.5
Memory (Megabytes)	32-64	32-64	64	128
Expanded Storage (Megabytes)	Not applicable	256	256	512
Channels	16-24	16-32	32-48	64-90
Price (Memory)	\$1.7 million (32M bytes)	\$2.6 million (32M bytes)	\$4.5 million (64M bytes)	\$8.5 million (128M bytes)
Price to Upgrade to Next Model	\$900,000	\$1.9 million	\$4.3 million	Not applicable
Availability	October	April	Now	Fourth-quarter 1986

¹ Million instructions per second, based on CW estimates

CW Chart

3097 power and coolant distribution system, the \$111,000 Model 2.

■ MVS/SP Version 2.1.7, which lets the Model 400 run in single or partitioned mode and combines up to four vector processing facilities with IBM's Extended Recovery Facility.

■ Support for the 3090 Vector Facility under VM/XA.

■ The Vector Facility Simulator, a \$9,500 program that enables developers to debug and test programs before the vector facility is installed.

■ VS Fortran Execution Analyzer, which costs \$12,500 and lets applica-

tion programmers identify compute-intensive portions of their programs.

IBM's Data Systems Division marketing manager, Carl Greiner, said the expanded memory feature, which is implemented on 288M-byte chips, speeds operations such as paging. "What it allows us to do is to go much beyond the 2G-byte limit, which is the current architectural limit within Extended Architecture. . . . We will be able to provide larger and larger storages through expanded. Second, expanded is much more reliable than current main storage."

IBM realigns mainframes

From page 1

the existing 3080 market. IBM rates the \$1.7 million Model 150 at 1.1 to 1.2 times the power of the 3083 Model JX in a commercial environment and slightly faster in scientific applications, which apparently places the 150 in the range of 9.2 to 10.9 million instructions per second (MIPS). IBM rated the \$2.6 million Model 180 at 1.7 to 1.8 times faster than the 3083 Model JX in commercial processing

for an estimated performance of 14.2 to 17.6 MIPS.

The replacement of the 4341 and 4381 lines with four new 4381s, ranging from 1.5 MIPS to 6 MIPS, was viewed as an attempt to fend off competition from supermini companies such as Digital Equipment Corp.

"IBM responded to a number of things going on in the marketplace," Gens said. Those factors, he added, are an overall slowness in demand, MIS budgets still seen as being a little tight in 1986, the confusion by users over the positioning of the 3090s against the 3080s and competition from the used 3080 market.

Kidder, Peabody & Co. analyst

William Easterbrook added, "The new 4381s are more aggressively priced than I thought they would be. It appears that IBM is really trying to beef up business for the year."

Other observers viewed the 4381 announcement as little more than a price cut, with a limited performance gain at the high end, designed to rejuvenate lagging 4381 sales (see story page 6).

IBM officials commenting on the announcement emphasized the migration paths that are open to users of both the 4381 and 3090 lines.

James Hahn, IBM's director of large systems marketing for the North Central Marketing Division, said customers can gain fivefold performance increases as they move from the entry-level systems up to the top-end systems in both series.

For customers with Model 1, 2 or 3 systems on order, Models 12, 13 and 14 — which IBM claims offer average performance improvements of 33% — will be substituted. Those systems will be available for new orders in April. The low-end Model 11 will be available in May, when the 4341 is discontinued.

The price cuts were surprising particularly as they apply to the 3090 Model 400, a machine that is not scheduled for delivery until late 1986, said Svend Hartmann, president of Computer Merchants, Inc., a Chappaqua, N.Y.-based computer dealer and lessor. The only likely buyers for new 3080s will be current 3080 users who want to upgrade their systems but cannot afford a 3090, he said, adding that the value of used 3080s will plummet.

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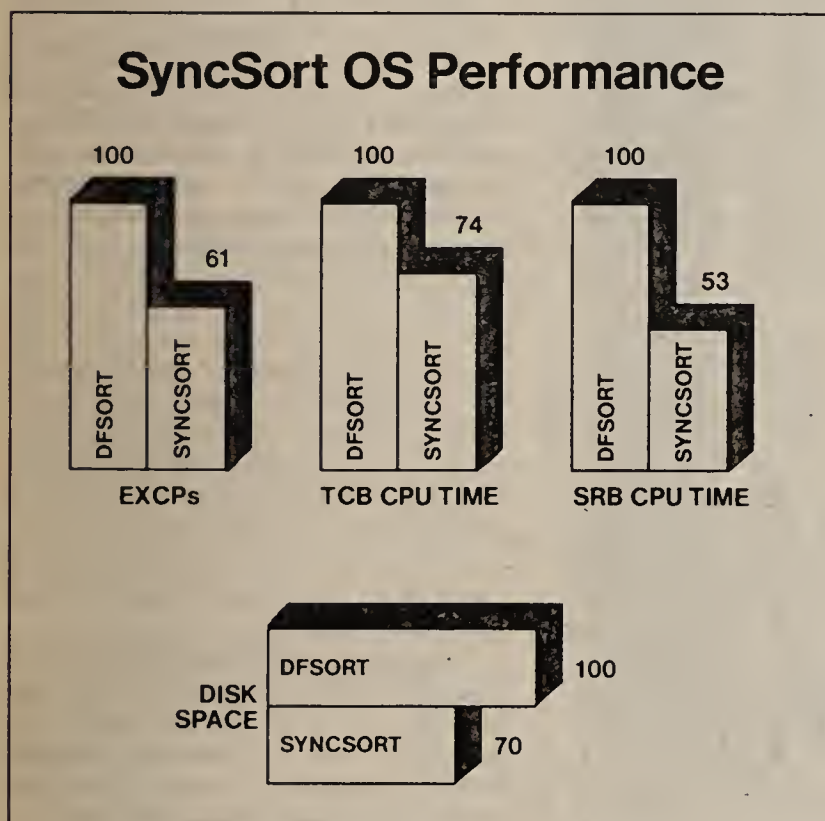
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NEWS

Changes in IBM 4381 family spark debate over line's future

By James Connolly

RYE BROOK, N.Y. — IBM's replacement of the 4381 family with four new processors last week was seen by some observers as a performance boost and by others as a disguised price cut.

ANALYSIS

IBM claimed that the systems provide an average of 33% better performance than the existing 4381s, which can be upgraded to the new models. Analysts agreed that 4381 users needed that power.

The new models include the entry-level 4381 Model 11, the mid-range uniprocessor Models 12 and 13 and the dual-processor Model 14. In addition, IBM has halted sales of the 4381 Models 1, 2 and 3 and will stop selling the 4341 when the Model 11 is delivered in May. Maintenance for the 4341 is expected to continue for several years.

IBM officials said the improvements, which include cutting the machine cycle time from 68 nsec to 56 nsec for the Models 13 and 14, were made possible through use of a faster and denser logic chip, more micro-code assists and the expansion of buffers to 64K bytes on the Models 13 and 14. IBM said field upgrades, which involve board replacement, will take 6 to 14 hours.

"My first reaction is that it sounds pretty good. It sounds like we can upgrade if we want and get 30% more power," said James McCoy, director of hospital data systems at Indiana

IBM's 4381 processors				
	Model 11	Model 12	Model 13	Model 14
Processors	1	1	1	2
MIPS ¹	1.5	2.8	3.5	6
Machine Cycle Time (Nsec)	68	68	56	56
Memory (Megabytes)	4-16	8-32	8-32	16-32 ²
Buffer (Kilobytes)	4	32	64	64 ²
Channels	6-12	6-12	6-12	12-18
Price (Memory)	\$185,000 (4M bytes)	\$330,000 (8M bytes)	\$440,000 (8M bytes)	\$735,000 (16M bytes)
Typical Upgrade Price	\$115,000	110,000	\$110,000	Not applicable
Availability	May	April	April	April

¹ Million instructions per second, based on CW estimates

² Per CPU

CW Chart

University Hospitals in Indianapolis. "We bought our 4381 about a year ago, and I would have been upset if we could not upgrade. I think we can get another year or a year and a half out of an upgrade, and we can also look at going to the Model 14. So we can stay with the 4381 line for a few more years," he said.

Performance gains of up to 42%

The Model 14 provides performance gains of up to 42% over the Model 3, according to IBM. The gain would give the Model 14 a rating of

more than 6 million instructions per second (MIPS). However, several analysts said that in interactive environments where such a high-end superminicomputer would be used, the system is likely to perform 5.7 MIPS. IBM rated the Model 12 up to 36% faster than the Model 1 and the Model 13 30% faster than the Model 2.

Several analysts said the announcements confirm the speculation that the 4381 line will be replaced again next year but with a CMOS-based system to which no direct upgrade will be allowed.

International Data Corp. analyst Frank Gens said that even the threatened replacement of the 4381 in a year "is not bad news for people looking at these new models" because of the room they have to upgrade within the new and previous 4381 product line.

"The prices in some cases are less than half what they were, although the performance increase is only about 30%. I think the future of the 4300 series will continue that type of downward trend," added Peter Lowber, analyst for the Yankee Group.

Announcements narrowed the distance

Several analysts said that the 4381 announcements narrowed the distance between IBM and its superminicomputer competitors in terms of price/performance. They also noted that in some scientific applications, the 4381 family bests the competition, although on some applications, IBM maintains a ratio of more than \$100,000 per MIPS.

However, Russell West, vice-president of marketing at Comdisco, Inc., a computer dealer and lessor, said the 4381 announcements represented little more than a price cut to stimulate 4381 sales and upgrades.

"IBM is trying to get that last squeeze out of the 4381 installed base," said West, noting that IBM can pick up significant revenue by convincing 4381 users to spend \$50,000 to \$80,000 for model upgrades plus the cost of added memory.

Unbundling shocks mart

From page 1

icy, but he said it will apply both to current users and new Sperry cus-

tomers. Although Maynard said the specific terms and charges would not be finalized until this week, some buyers of Sperry equipment have already been affected by it, *Computerworld* has learned.

Waukesah-Pearce Industries, Inc., a Houston-based oil and construction equipment firm, decided to purchase

directly a Sperry 1180 earlier this month after learning of the software charge it faced by buying from a third party.

"We had a deal all set to go," said John McNamara, Waukesah's director of information systems. "Then the Sperry sales reps told us there would be a \$48,000 charge for the op-

erating system and a \$10,000 charge for installation. . . . We got a letter from Blue Bell saying it would be corporate policy shortly. We're relatively happy with the deal we've made with Sperry, except when we try to resell the machine. This is a real bombshell for anyone who owns one and wants to sell it."

Sources said the operating system charges could range as high as \$125,000, but no prices were confirmed by Sperry. Users and leasing firms expressed concern about the policy's potential effect on the market for used Sperry machines.

"This policy needs to be reviewed because of the potential impact, at least on a grandfather basis," said Howard Shulman, president of Use, Inc., an independent Sperry mainframe users group. "Sperry made a change in their pricing policy and did not recognize the potential annoyance that would be created."

The policy could have a strong effect on Sperry equipment lessors and brokers, whose profits often depend on a computer's residual value. "We were just made aware of the policy, and we're still trying to verify it through Sperry," said a regional manager of Equitable Life Leasing Co. "We bought \$25 million worth of Sperry equipment last year, and we're concerned about it."

"There are a lot of used machines out there, and Sperry is killing the end user's residual value," said John O'Brien, vice-president of Save Systems, Inc., a Chagrin Falls, Ohio-based broker of Sperry and Data-point Corp. computers.

CW senior editor James Connolly contributed to this story.

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NEWS

Banks integrate nets, experiment with divestiture options

Phone service problem spurs industry debate

By Charles Babcock

ORLANDO, Fla. — Financial institutions are finding new ways to streamline their data networks, telecommunications and data processing, according to industry representatives at the American Banking Association's annual conference held last week.

Such efficiency gains are sorely needed if additional performance is to be squeezed out of fewer equipment purchases, which would help banks compete in the era of deregulation, banking spokesmen said.

In a time of rapidly expanding services and merging institutions, one of the areas of greatest gain is in network integration, according to Rick Higgins, director of network resources for First Interstate Services Co., the data processing arm of First Interstate Bancorp of Los Angeles.

"Institutions with integrated networks will be much more able to compete in interstate banking than those who have a splintered environment," he said.

Voice communications

Voice communications is another concern of bankers. Lawrence W. Postel, director of communications for the Depository Trust Co. in New York, said long lead times for new line installations and slow maintenance service has prompted his company to decide to bypass the Nynex Corp. regional holding company and install its own phone system.

"Service is terrible. Mean time to repair is terrible. Divestiture created a mess," he said. His company is tired of "dealing with 19 different people" each time it wants to solve a problem, he said.

Depository Trust handles millions

of stock transactions a day for the Securities and Exchange Commission, using 3,000 IBM 3270 terminals. "On any given day, 10% of them will be down because of phone line problems," he noted.

Although it is still considering alternatives, Depository Trust is planning to install T1 capacity and use microwave transmission between buildings.

There appeared to be a consensus that divestiture has cost financial institutions money rather than saving them money. "The effect of the breakup of AT&T has been unfavorable to banks," said George Raff, manager of Peat, Marwick, Mitchell & Co.'s Boston office.

"Costs have risen, and service is more volatile," he said. Like many other industries, financial institutions are hiring their own communications managers and paying a premium for experienced people.

Enough institutions have been bruised in trying to deal with communications problems that one banking official, Barry W. Lawson, senior vice-president of the First National Processing director, said he detected a renewed interest in letting the regional Bell holding companies reassume responsibility.

"Now that they've had a taste of running their own phone company, they're rethinking their stance. Some

are moving back to Ma Bell," he said.

William P. Harris, branch operations manager for Fidelity Bank NA of Philadelphia, said his job has been made more complicated by a merger between his bank and the Industrial Valley Bank & Trading Co. of Philadelphia. He currently supervises 97 branches, a number that will increase to 140 when the merger is completed.

Fidelity is attempting to automate the role of the branch operations by installing IBM 4702 terminals for both tellers and platform sales representatives, he said.

The bank has installed 4702s in 12 of its branches in a pilot project to tie them more closely to the central office over leased lines.

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		60	83335	80	1600	79	1524	1	76
		90	83305	72	1478	74	1478		
		120	83275	72	1478	74	1478		
		150	83245	72	1478	74	1478		
		180	83215	72	1478	74	1478		

Space occupied by data sets inactive for 30 days

Savings over full volume dump

VOLSER	DEVTYPE	AOAYS	AOATE	TOTAL OSNS	TOTAL TRACKS	PS/PO OSNS	PS/PO TRACKS	OTHERS OSNS	OTHERS TRACKS
TOTAL	3380	30	83365	1523	19800	1467	17924	56	1876
		60	83335	1493	18776	1446	17100	47	1676
		90	83305	1492	18700	1446	17100	46	1600
		120	83275	1492	18700	1446	17100	46	1600
		150	83245	1486	18100	1446	17100	30	1000
		180	83215	1486	18100	1446	17100	30	1000

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MVSYS2	3380	13275	11223	97	85%	1634	18	12%	9589	79	86%
TS0001	3350	16650	16125	968	96%	4015	29	24%	12110	939	75%
TS0002	3350	16650	15500	812	93%	3900	150	23%	11600	662	74%
TOTAL	3350	33300	31625	1780	95%	7915	179	24%	23710	1601	75%
TOTAL	3380	26550	18582	221	70%	5581	109	21%	13001	112	70%

TOP OF THE NEWS

NEWS from page 1
next two years.

Motorola denied published reports of a planned merger between its semiconductor operations and those of Japanese competitor Toshiba. In a memo to the company's executives, Motorola Chairman Robert Galvin said, "There has not been, and there is not now, any formal proposal concerning such a plan, and there is no foreseeable prospect of such." Galvin said that the corporation's attorneys had been asked for a written opinion on the legality of such a hypothetical merger, with Toshiba chosen only as an example, and that the attorneys advised against a merger.

IBM reduced by 20% the price it charges dealers for the dual floppy-drive model of its Personal Computer, according to Michele Preston, a computer analyst with L. F. Rothschild, Unterberg Towbin.

IBM refused to confirm the figures.

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 - 50. Business Service (except DP)
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 - 65. Public Utility/Communications Systems/Transportation
 - 70. Mining/Construction/Petroleum/Refining/Agriculture
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 - 85. Computer Service Bureau/Software/Planning/Consulting
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75. User: Other _____

95. Vendor: Other _____

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 - 13. Treasurer/Controller/Financial Officer
 - 21. Director/Manager/Supervisor DP/MIS Services
 - 22. Director/Manager of Operations/Planning/Admin. Serv
 - 23. Systems Manager/Systems Analyst
 - 31. Manager/Supervisor Programming
 - 32. Programmer/Methods Analyst
 - 35. QA/WP Director/Manager/Supervisor
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41. Engineering/Scientific/ R&D/Technical Mgmt.

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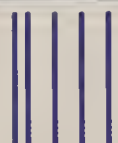
90. Other _____

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Types of equipment with which you are personally involved either as a user, vendor or consultant.

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NEWS

Staff suspended after slipup

From page 1

transfer network. The test was part of a nationwide effort to upgrade the Federal Reserve's wire transfer net. Employees of the bank's systems division failed to delete a file of test data from the network's communications queue when they finished testing the software during the Jan. 18-20 holiday weekend. The bank, which publicly acknowledged the accident earlier this month, declined comment on the reasons for this failure. The employees were suspended for three days without pay as punishment for their misadventure.

Files went as live data

The omission left 1,100 test transactions totaling \$2 billion "queued up and ready for retransmission in our network's communications switch," according to Carl Powell, the bank's senior vice-president of finance and product management. "So when we returned to work after the three-day break and reactivated the switch, the files automatically went out again over our network as if they were live data." Because the test transmissions were duplicates of transactions that had already taken place on Jan. 17, the accidental cash transfers were spotted and reported almost immediately by most of their unintended recipients. But two of the 19 banks deferred notification for 24 hours. A bank spokesman said that the two client institutions did not use the delay to their financial benefit. Neither of the banks earned a cent of interest from the mistake, the spokesman said, because "the transmissions were part of a test and therefore

were not credited to any of the recipients' accounts." The spokesman declined to name any of the 19 Federal Reserve Bank customers that were affected by the erroneous wire transfers. Nor was he able to explain why two of the institutions failed to report the mistake immediately. "It's still a mystery to all of us here," he said. The software test that went awry was part of a project fostered by the national Federal Reserve Bank to help minimize its software maintenance costs. Until recently, each of the 12 districts that form the nationwide Federal Reserve Bank system developed their wire transfer software packages independently. The resulting lack of standards "created system redundancies and forced us to modify a different program in each district every time our business requirements changed," Powell said. **Package written internally** Last year, in an attempt to introduce some uniformity to its network, the Federal Reserve Bank began a search for a funds transfer program that it could apply universally across all 12 regions. The result was the selection of a package written internally by its own New York district branch office. The software appeared at the San Francisco Western district headquarters in late January. "But instead of just throwing it on-line and using it cold on Jan. 21, we tested it beforehand to make sure it works," the local bank spokesman said. The test called for an extract file containing about 1,100 transactions "to be delivered to the controller

switch in our wire transfer network and processed through the new software package," Powell said. But when the exercise was complete, several members of the bank's computer services and communications staff forgot to delete their queue of test transactions from the communications switch. Their lapse paved the way for the \$2 billion transmission error, which reportedly accounts for less than 2% of the \$120 million that the Western district office typically sends over its wire transfer network each day. To prevent a repetition of the \$2 billion accident, the Federal Reserve Bank recently adopted a policy that forbids the use of genuine transactions in tests of its networking capabilities. "From now on, we'll use fictitious accounts in our tests," the spokesman said.

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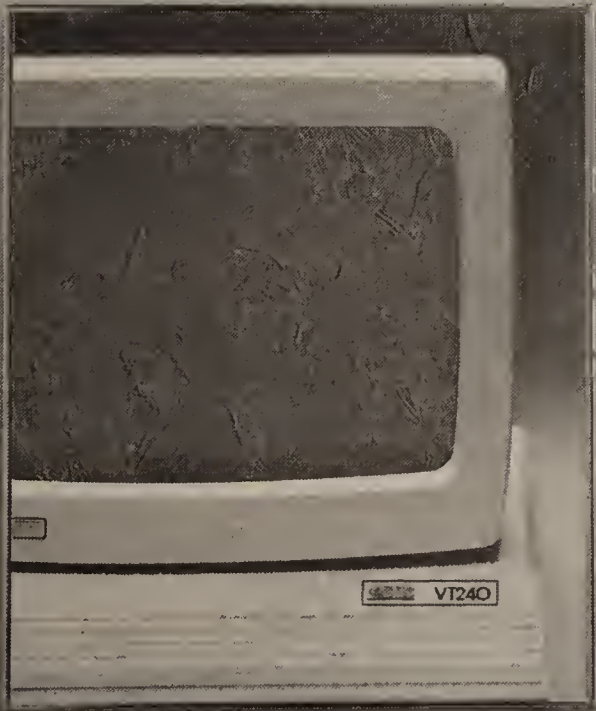
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AT&T refiles price plan with FCC

WASHINGTON, D.C. — AT&T last week refiled its optional long-distance pricing plan with the Federal Communications Commission. Called Pro America, the plan is aimed at small and medium-size businesses. For a \$15 monthly fee, Pro America users would receive a 10% discount on directly dialed interstate long-distance calls. Last year the FCC rejected an earlier version of Pro America, saying AT&T had not provided sufficient justification for the rates and had underestimated revenue and demand for the service. AT&T said it wants to start the service March 28. The Pro America tariffs have been opposed by AT&T's principal competitors, MCI Communications Corp. and GTE Sprint Communications Corp. Also last week, MCI announced Prism II, a bulk calling service for medium-size businesses that is scheduled to start March 1. It is priced 5% to 14% below AT&T's WATS rates and is aimed at the subscribers who accumulate between 200 and 1,000 hours of calls monthly and whose calling costs range between \$1,500 and \$20,000 monthly, MCI said.

— Bryan Wilkins

NEWS

Congress eyes harshly FCC's deregulatory policy for AT&T

Hearings to address relaxation of FCC rules

By Bryan Wilkins

WASHINGTON, D.C. — U.S. House of Representatives Commerce Committee Chairman John D. Dingell (D-Mich.) charged last week that the Federal Communications Commission abandoned "all pretense of fostering true long-distance competition" by permitting AT&T to price its services in a manner that allows "below-cost and discriminatory pricing."

Dingell said the House Telecommunications Subcommittee, of which he is an ex officio member, will ques-

tion the FCC's deregulatory policies toward AT&T in a series of hearings beginning this week.

Dingell's comments came at the annual meeting of the Competitive Telecommunications Association (Comptel), which represents AT&T's long-distance competitors.

Congressional interest in telecommunications issues has made a brief resurgence in the last few months. The renewed interest is a result of the FCC's recent actions permitting relaxation of the regulatory rules placed on AT&T's deregulated marketing and telephone equipment sales forces. The commission is now proposing further relaxation of the rules in the Third Computer Inquiry,

which has alarmed other sectors of the telecommunications industry.

"The entrenched power of this magnitude does not dissipate overnight," Dingell said last week.

Dingell also accused AT&T of reconstructing an end-to-end network by engaging in bypass of local telephone company exchanges. "By directly linking large customers to its ubiquitous long-distance switches," Dingell charged, AT&T ensured it will serve the 5% of business customers who generate 50% of telephone revenue.

Dingell said he supported legislation changing the restrictions barring the former Bell operating companies from entering the information ser-

vices and equipment manufacturing business and eventually permitting them to enter the long-distance market. These positions are at variance with the views of the Comptel members who otherwise welcomed Dingell's attack on the current deregulatory posture of the FCC.

Teenager charged with four counts of illegal hacking

By Peggy Watt

SEATTLE — The King County prosecutor's office last week filed four counts of computer trespass against an 18-year-old Kirkland, Wash., man who admitted to breaking in electronically to the computers of four Seattle-area companies, including microcomputer software developer Microsoft Corp.

Bellevue, Wash., police, who conducted a five-month investigation of the break-ins, said Michael Princeton Wilkerson had so thoroughly infiltrated the computer systems that he had more access than even some of the systems operators. Prosecutor Ivan Orton said Wilkerson could apparently issue payroll checks at one company and establish new accounts and passwords locking out system operators at several others.

Apparent victims also included Resource Conservation Co. in Bellevue; Sunstrand Data Control in Redmonds, Wash.; and Kenworth Truck Co. in Kirkland.

Created new accounts

Resource Conservation said it keeps confidential information — including proposals and financial and technical material — on high-performance water management systems in its computer, on which Wilkerson apparently created two new accounts. Sunstrand designs and manufactures avionic electronic products, some of them under government contracts. The company shut down at one point last fall when systems operators suspected illegal entry.

Kenworth's computer handles marketing and sales, engineering, design and administrative data. The trespasser allegedly changed one system password, temporarily denied access to authorized users and copied some files.

The prosecutor said Microsoft became aware of a security breach last fall and authorized a police telephone tap, which traced the unauthorized access to the home of a 16-year-old Bellevue boy who had gotten the number and access codes from Wilkerson. The juvenile was not charged.

Police seized several computers and more than 300 floppy disks from Wilkerson's home, along with a list of credit card numbers with owners' names and the expiration dates, printouts of information from Microsoft and directions and access codes to dial up the credit reporting agency TRW, Inc. Wilkerson reportedly admitted checking some 50,000 telephone numbers for modem tones.

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Cincinnati Jan 14, Mar 4
Cleveland Feb 12
Columbia, SC Mar 11
Columbus Jan 15, Mar 5
Convent Station, NJ Feb 13
Dallas Jan 14, Feb 25
Dayton Feb 11
Denver Jan 15, Feb 13, Mar 13
Des Moines Mar 19
Detroit Jan 9, Feb 18, Mar 13
El Paso Feb 4
Ft. Worth Mar 11
Grand Rapids Jan 23
Halifax Jan 15, Mar 19

Houston Jan 9, 21, Feb 20, Mar 20
Indianapolis Mar 11
Iselin, NJ Jan 23, Mar 20
Jacksonville, FL Jan 15
Kansas City Feb 5
Lansing Mar 11
Little Rock Feb 8, Mar 13
Louisville Feb 26
Los Angeles Jan 14, Feb 11, Mar 13
Milwaukee Feb 19
Minneapolis Mar 27
Montgomery, AL Feb 20
Montreal Feb 18
Nashville Jan 16
New Orleans Feb 13
New York City Jan 8, 22, Feb 5, 18, Mar 11, 19
Newport Beach Jan 16, Mar 18
Oklahoma City Feb 11
Omaha Jan 23
Ottawa Jan 9, Feb 13, Mar 13
Philadelphia Jan 16, Mar 20

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NEWS

AT A GLANCE

CHASE LINCOLN FIRST BANK NA

Headquarters:
Rochester, N.Y.

Network:

Currently, Northern Telecom, Inc. SL1 private branch exchanges installed in Rochester, Buffalo, Syracuse, Binghamton, Albany, Jamestown and Watertown, all in New York, and Mitel Corp. SX100 in Canton, NY.

Planned:

T1 links between Rochester, Syracuse and Buffalo by the end of 1986 and with Binghamton by first-quarter 1987. Will run both voice and data through T1 link.

Suppliers:

Rochester Telephone Co. subsidiaries: Rotelcom supplies Amdahl Corp. 2211 T1 multiplexers. RCI supplies inter-Local Access and Transport Area carrier microwave T1 backbones between Rochester and other cities. Local telephone companies will supply "tail circuits" (data lines) from bank facility where T1 terminates to offices within the region. Some lines come from AT&T.

Net values: Watching ISDN

From page 1

attitude toward the technology.

"Our end users still tell us, 'Sure, you'll have ISDN. What's in it for us?'" comments James Huskison, district staff manager for product development at U.S. West.

Promoting vaporware

One reason for business users' wariness is that vendors began publicizing ISDN long before the technology was likely to be delivered. According to many industry experts, businesses may have to wait a decade or more for ISDN availability.

Even the carriers are cautious

about committing themselves to an unrealistic time frame. "It should be a three- to seven-year project for each former Bell company to have a mature ISDN network," Huskison says. "Obviously, metropolitan areas with high-density traffic will get it first because the major customers are there."

Financial companies whose competitive survival depends on efficient, reliable data communications links cannot afford to put their communications needs on hold while they wait for ISDN to arrive. Two banks that have chosen to implement currently available communications technologies are Chase Lincoln and First National Bank of Chicago.

Kenneth Jankowski, manager of the Chicago bank's First Call telecommunications unit, notes that "ISDN is still in its early planning stages."

He enumerates some of the important steps leading to a commercially viable ISDN: First, carriers must adopt uniform ISDN protocols for their central office switches. Second, customer premises equipment vendors must produce real ISDN products instead of just talking about them. And third, cost-performance numbers that will enable telecommunications managers to estimate potential paybacks must be available.

"Until then, we want to keep our options open," Jankowski adds.

'There's so much hype out there'

Fornieri of Chase Lincoln expresses a similar view: "I'm not going to wait five years when I can get the cost savings and communications flexibility I want right now. There's so much hype out there; that's why we're going with an established, proven technology."

Chase Lincoln plans next year to set up 1.544M bit/sec. T1 links between its New York offices in Buffalo, Rochester, Syracuse and Binghamton. Rochester Telephone Co. is supplying the lines as well as equipment through its subsidiary, Rotelcom.

According to Fornieri, the bank will start simply, with direct point-to-point links between branch office private branch exchanges (PBX) and Rochester headquarters. He says he expects the installation to pay for itself rapidly. "We get extra capacity for less cost, and we can integrate additional services without running new lines."

Fornieri sees his bank moving toward ISDN gradually through the addition of new networking options such as a ring topology that would allow alternate routing.

Even if ISDN were commercially available today, Chase Lincoln would not be ready for the technology. "Right now we're just getting involved with T1 site-to-site connections," Fornieri says. "We're beginning to learn about digital technology and how it can fulfill our needs; then when ISDN comes along, we'll be prepared."

First National Bank of Chicago has also chosen to implement proven networking products now rather than wait for the commercial availability of ISDN. Jankowski is responsible for planning, implementing, managing and maintaining a network of AT&T System 85 PBXs, leased and fiber-optic lines that link the bank's sites within the Chicago region. A T1

Continued on page 13

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REALIA
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NEWS

Continued from page 12

line connects headquarters to branch offices in New York City.

"Because we are relying on T1 and [digital PBX] System 85, we can deliver end-to-end digital communications, and we're well on the way to our goal of integrating voice, data, video and office automation applications on one network," Jankowski says.

First National will almost certainly implement ISDN at some future date. "It will enable us to take immediate advantage of any link offered by carriers," Jankowski says.

"Right now, there is a three- to four-month lag time when we want to change in and out of various voice services like WATS or AT&T

Dataphone Digital Service. ISDN will let us access these services on a demand basis by going to a terminal configuring for a particular kind of net and punching a button."

No illusions

Jankowski has no illusions, however, about how much it is likely to cost the bank to convert to ISDN from its present system. "The customer premises equipment alternatives are the cloudiest area of ISDN. The vendors may say that all you have to do is add a board to the boxes they have already sold you. But why should they offer you a card when, if you're committed to the future, they can sell you a brand new box? The present boxes are just not designed for ISDN."

First National's long-term telecommunications strategy takes into account the likelihood that the advent of ISDN will make a large percentage of the bank's present equipment obsolete.

"We have a really healthy plan for reusing our present T1 multiplexers to interface on-premises PBX twisted-pair wiring with a regional fiber-optic network that we plan to install," Jankowski explains.

"We want to maintain a position of maximum flexibility," he adds. "We buy equipment with a short economic life span: Either it has a two-year payback period or we lease it for two years. This allows us to change horses every two years or so." This plan also maintains what Jankowski considers an optimal vendor relationship. "If we go with vendor A, we still retain the interest of other vendors, who get a chance to dislodge vendor A in two years. And vendor A

AT A GLANCE

FIRST NATIONAL BANK OF CHICAGO

Headquarters:
Chicago

Network:
Two closely coupled AT&T System 85 PBXs supporting 10,000 stations located at headquarters in Chicago. One T1 link between Chicago and New York leased from AT&T. One AT&T 735 Tmux on each end. Multiplexers and modems from General Datacomm, Inc., Racal-Milgo, Inc., Paradyne Corp. and AT&T distribute financial services and information to customers and bank offices within each region. Some of the lines are leased from AT&T; others are fiber-optic links owned by the bank.

knows he has to keep on justifying to us our choice to go with his products. We reap the benefits of competition."

Jankowski further claims that telecommunications managers' present dealings with T1 vendors, services and equipment are preparing them to work effectively with ISDN when it finally does come along. "Our pres-

ent equipment is software driven, so staffs are learning how to dynamically reconfigure network services, just as they will in an ISDN environment," he says. "Where other organizations will be going through steep learning curves before they can even start to use ISDN, we're already ahead in the ball game."

Report links VDTs, birth defects

By Mitch Betts

WASHINGTON, D.C. — Swedish researchers have reported a link between VDT radiation and birth defects in mice, but sponsors and U.S. observers cautioned that the study is preliminary, incomplete and does not necessarily apply to humans.

Sweden's National Board of Occupational Safety and Health and National Institute of Radiation Protection recently issued a joint statement saying that research showed "low-frequency pulsed magnetic fields of a kind similar to those appearing at VDTs and TV sets seem to have an influence on the pregnancy outcome of mice and rats."

The statement continued, "The importance of these findings for humans is not clear, but earlier studies on women working with VDTs have not shown any harmful effects on pregnancies. The findings have to be followed up with different kinds of research activities."

Malformed fetuses

Specifically, the Swedish study exposed pregnant mice to pulsed radiation and found a high incidence of malformed and dead fetuses. The statement also mentioned a study by Poland's Institute for Industrial Medicine, which found that the testicles of male rats lost weight when the animals were kept close to TV screens.

Renee S. Ross, executive director of the U.S. Center for Office Technology, said it is premature to draw conclusions from the Swedish study, which is not complete

and is not yet ready for peer review in the scientific community. The center, based in Washington, D.C., is an information clearinghouse on VDTs that is funded by the computer industry and some VDT-using corporations and industries [CW, June 10].

The study deals with the effect of electromagnetic fields on embryonic development in mice and may not apply to humans, Ross said. "The Swedish scientists themselves are quick to point out that the electromagnetic fields used are not from

VDTs, and the subjects of the research differ from humans in significant ways."

Ross stressed that more relevant studies on women using VDTs have been conducted in Sweden, Finland and Canada and have shown no evidence that VDTs cause miscarriages or birth defects.

A study by Finland's Institute of Occupational Health, which covered 1,475 mothers who had malformed children, concluded: "Our results do not give support to rumors that exposure to VDTs causes birth defects."

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NEWS

Workstation vendors clash

From page 2

where DEC cannot match IBM in pricing.

DEC's major success will be in the mid-range market, although it does offer low-end black-and-white workstations as well as high-end systems, analysts say. The mid-range market is devoted to such applications as electronic design. "It has been dominated by the Apollo DN 560," said Robert Herwick, an analyst with Hambrecht and Quist, Inc. "But this seg-

ment of the market comes down to religious beliefs. If you're from a VMS environment, you'll probably go with DEC now."

Herwick places IBM with its current offering in the "low end of the mid-range" and expects future announcements to set IBM more squarely against DEC.

Apollo will do well

Apollo will continue to do well in the high-end market, analysts say. This segment goes beyond religion because it requires the highest quality graphics and networking capabilities for sharing resources. "Apollo is really the best overall in terms of

networking and color graphics," said James Myer, an analyst with Janney Montgomery Scott, Inc. "It can still be the Cadillac of this world while DEC and IBM sell a lot more Chevrolets and Fords."

However, Apollo, has plans to sell Cadillacs, Chevrolets and Fords. A company spokesman said this Wednesday's announcement will include a low-end "PC-workstation hybrid," a mid-range product with boosted graphics performance based on new graphics technology and a high-end model that "comes close to supercomputer performance."

It remains to be seen, however, whether Apollo can be a factor in all three segments. "Apollo's only real opportunity is to become highly focused, like Prime Computer, Inc. did in the minicomputer market. A shotgun approach would be disastrous," said Thomas Rooney, an analyst with Donaldson, Lufkin & Jenrette.

A more immediate problem for Apollo is its closed-system image. Once its major strength, the Domain distributed computing environment has turned into its major weakness. Although Domain is considered the best workstation environment — one analyst described it as "eloquent" — it is not compatible with other computer systems. Over the past year, Apollo launched a major effort to combat this problem by offering two Unix options: AT&T's System V and the University of California at Berkeley Version 4.2 operating systems. It also announced gateways to VAX systems, IBM Personal Computers and the IBM Systems Network Architecture environment.

Sun offers what Apollo did not

Meanwhile, Sun gained a strong position by offering what Apollo did not — a system that could work in a heterogeneous environment.

And while Apollo has been getting heat for its proprietary Domain system, Sun has been touting its Network File System (NFS), which allows users to access files transparently across networks of multivendor systems. More than a dozen vendors, including DEC, have licensed NFS, helping Sun in its quest to make it an industry standard.

Sun's bare-bones approach — its recently announced system carried a price tag of \$7,900 — can be successful in the mid-range and low-end markets, although analysts speculate that the latter could be dangerous. "The low end is a jungle," said Jean Orr, analyst with Drexel Burnham Lambert, Inc. "The IBM PC AT became a major factor here last year, redefining a low-end system." Analysts expect other personal See **WORKSTATION** page 15

Engineering workstation market breakdown

Market Segment	Common Applications	Major Hardware Vendors	Price Range
High end	Three-dimensional design, solids modeling, simulation	Apollo Computer, Inc., Digital Equipment Corp., Silicon Graphics, Inc.	\$50,000 or more
Mid-range	Two-dimensional design, electronic design	Apollo, Sun Microsystems, Inc., Silicon Graphics, minicomputer companies	\$25,000 to \$50,000
Low end	Technical publishing, low-level computer-aided design	Apollo, DEC, Sun, IBM	\$25,000 or less

CW Chart

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NEWS

Workstation vendors clash

From page 14

computer offerings, perhaps a Unix version of Apple Computer, Inc.'s Macintosh, will soon hit the market, creating an arena that is particularly price sensitive. Since most low-end applications, such as technical publishing, do not require high-powered graphics capabilities, users will often make buying decisions based primarily on price. "IBM can really threaten the other vendors here because it's most capable of offering the best price/performance," Hambrecht and Quist's Herwick said.

Beyond the four major players, there are dozens of other companies

”
'Apollo can still be the Cadillac of this world while DEC and IBM sell a lot more Chevrolets and Fords.'

— James Myer
 Janney Montgomery Scott, Inc.

involved in the engineering workstation market. Analysts expect the major minicomputer vendors, Hewlett-Packard Co., Data General Corp., Prime and, eventually even Wang Laboratories, Inc., to continue on the second tier of activity, with HP being the strongest of the lot. HP is often ignored in the workstation war, but it did capture a 10.3% market share in 1985, according to International Data Corp., a market research firm in

Framingham, Mass. Without going head-to-head with the major workstation vendors, the minicomputer companies can score by selling into their existing customer bases.

While there is speculation that a shakeout is at hand in what appears to be a crowded market, there also seems to be room for a number of players. Estimates from market research firms vary, but the market is expected to pass the \$1 billion mark

before 1990.

And there are new uses for workstations currently being explored that could expand the market even more. At MIT in Cambridge, Mass., members of Project Athena are involved in approximately 80 different experiments with workstations, said Steven Lerman, the project's director. Working with DEC's Vaxstation II, Vaxstation II/GPX and the IBM RT Personal Computer — DEC and IBM are funding the project — the members are using workstations in classroom settings for such applications as "an expert tutor, an adjunct to graphical displays, a data acquisition device and a mediator in multiperson games," Lerman said. He expects there will be between 1,500 and 2,000 workstations installed for student use in a campuswide network by 1988.

Graphics tools out, prices cut

By Rosemary Hamilton

MOUNTAIN VIEW, Calif. — Silicon Graphics, Inc. rolled out its top-of-the-line, three-dimensional, real-time workstations last week and chopped the prices on its mid-range products.

The Series 3000, designed for such applications as solids modeling, simulation and animation, consists of the Iris 3010 terminal with a 20M-byte disk drive, the Iris 3020 workstation with a 72M-byte disk drive and the Iris 3030 workstation with a 170M-byte disk drive.

All three operate under AT&T Unix System V with University of California at Berkeley Version 4.2 enhancements.

Based on 68020 microprocessor

The systems are based on the Motorola, Inc. 68020 microprocessor and Silicon Graphics' proprietary Geometry Engines, which are very large-scale integration chips that function independently from the CPU and are dedicated to graphics processing.

In addition, each Series 3000 model comes with 2M bytes of main memory, expandable up to 16M bytes; 8-bit-plane image memory, expandable to 32 bit planes; a 20-slot chassis; and a 19-in. monitor.

A C compiler, the Iris Graphics Library II and the Iris Window Manager are standard software programs with the systems. The 3010 sells for \$39,900, the 3020 costs \$44,900 and the 3030 is priced at \$54,900.

Silicon Graphics cut the price on three of the six models in the Unix-based Series 2000 line, which are also 3-D, real-time workstations. The Iris 2400, a Motorola 68010-based workstation with 2M bytes of main memory — expandable up to 14M bytes — and a 72M-byte disk drive was reduced by almost 50% and will now sell for \$24,900. The Iris 2500, which comes with a 474M-byte disk drive, will cost \$59,500, down from \$74,900. And the Iris 2300, an execute-only workstation with a 20M-byte disk, was reduced by \$10,000 and now sells for \$24,900.

Users of the Series 2000 can upgrade to the 3000 level for various prices, depending on the model.

“Not during
 a full moon
 I won't.”

—Computer backup excuse #243

People can get very superstitious about when they do their computer backup. Especially if it gives them an excuse for not doing it at all.

Because, after all, backing up is about as exciting as watching paint dry.

One way to take the curse off is to do it first thing in the morning. If you're one of those slow starters who has to have coffee and push some papers around for awhile when you get to work, that dead time could be perfect for backup.

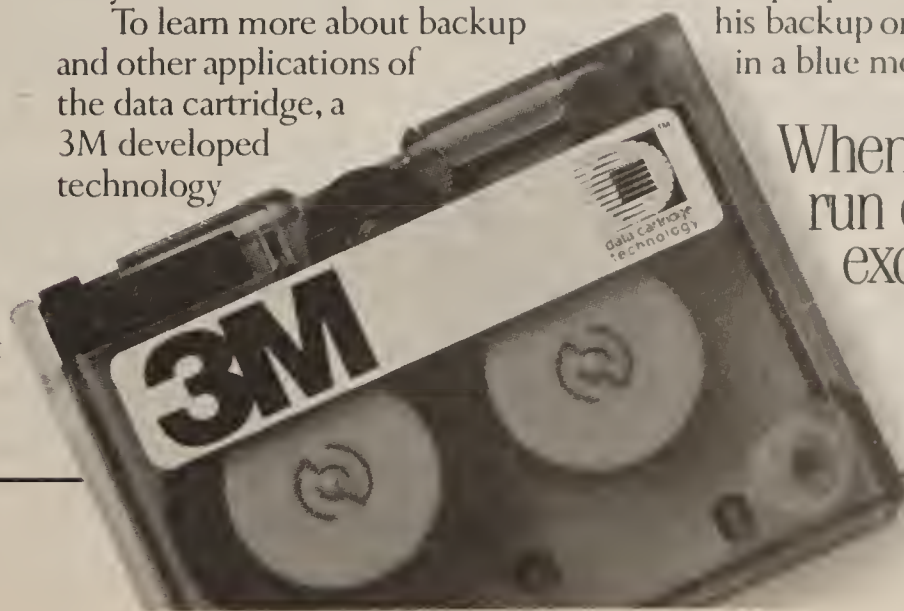
As for how to do it, the floppy disk is fine if you have a limited amount of memory, and the data cartridge for 5 to 10 Mbytes or over.

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VIEWPOINT

EDITORIAL

Yearning for Ma Bell

Communications users complain a great deal these days.

Life in the postdivestiture communications world is tough, no doubt about it. Calling Ma Bell and letting her worry about everything was easy; taking on circuit-to-circuit responsibilities yourself is not. That's the negative.

The positive, of course, is near-rampant competition. Carriers want business, and to get it, they are beginning to offer a myriad of new service and price options.

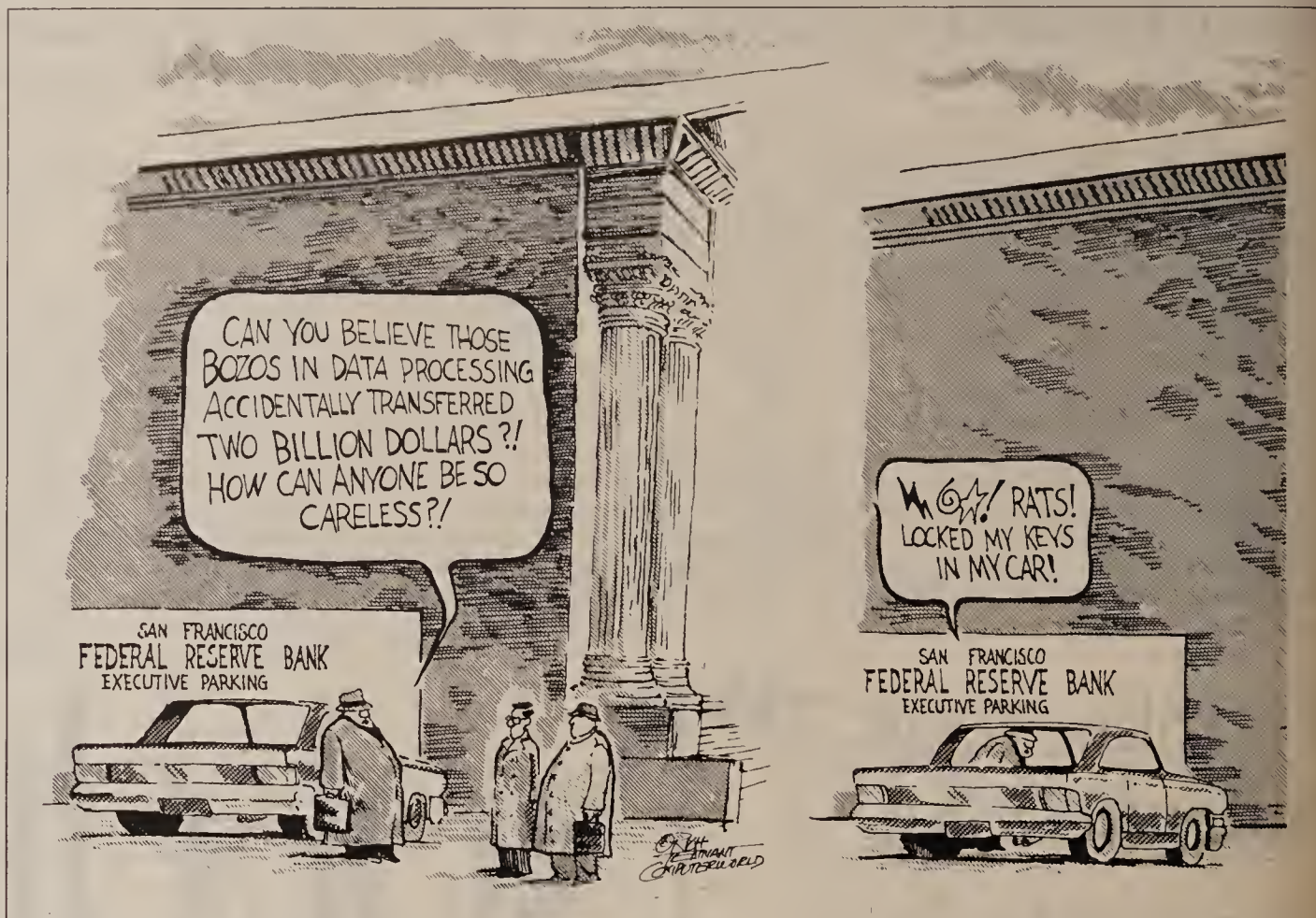
Still, communications users want it all. They want lower prices, more choices and one-stop service. A case in point: The federal government has just announced the Federal Telecommunications System (FTS) 2000 [CW, Feb. 10], the largest telecommunications procurement on record at \$4 billion and a self-described model for Fortune 1,000 corporations on how to operate in a postdivestiture environment. Right now, the General Services Administration is looking for a surrogate for Ma Bell, a prime service contractor that will assume overall responsibility for installing, managing and maintaining the system as well as for signing up subcontractors to supply equipment and services it cannot.

At January's Communication Networks '86 conference, a telecommunications manager presented a different and far more realistic scenario. After a painful experience with a multivendor network in which the local telephone company simply could not keep track of switches, he and his telecom staff took over. Now they monitor the network themselves at installation and on an ongoing basis, so that when something goes wrong, they are armed with the statistics to tell the vendor where the problem is and prevent finger pointing before it starts.

To do otherwise is to engage in wishful thinking, to expect all the benefits of competition and all the security of monopoly. Even when organizations choose a single vendor, it is still primarily up to telecommunications managers and their staffs to become their own maintenance companies. They alone can be the one-source service and maintenance providers for their companies.

Notes & observations

As long as we're on the subject of communications, we would like to say a few positive words on the subject of the Integrated Services Digital Network — ISDN to you — which is further explored in an article beginning on page one of this week's issue of *Computerworld*. ISDN is a forbidding amalgam of protocol and technology that holds out the promise of truly transparent user access to disparate vendor services. Now, who could not be in favor of something that promising? That would be similar to opposing the idea of the United Nations back in 1945. Trouble is, we now know what happened to the United Nations, splendid idea though it was. Nevertheless, we think ISDN, too, is a splendid idea that could foster truly universal global communications. Sure, it could also end up a useless, toothless computer Esperanto. We will never know until it is explored more fully and until then, the effort appears fully warranted. Vendors and users alike are encouraged to support this exploration.



LETTERS TO THE EDITOR

Gartner Group's Braude challenged

Relational DBMS technology is "religious" and "theological?"

Avoid comparing dozens of technical features of competing data base management systems in favor of their vendors' "personalities?" Take note, *Computerworld*, you'll want to add a "company personality" column to all future product comparison tables.

Wait up to four years for promised software, ignoring several superbly integrated, marketplace-proven DBMS, data dictionary and fourth-generation language products?

These and other statements were unchallenged in an interview with the Gartner Group's Michael Braude [CW, Jan. 20].

I suggest *Computerworld* review the denotation of the word "interview."

Braude speaks for no competent, knowledgeable, experienced and impartial member of the computing profession I know of or can imagine.

The best use a company can make of advice of this ilk is to give it to their competition.

Henry J. Meyer
Consultant

System upgrades pose DP dilemma

I was frustrated by the response in "Turn-around Time" to the MIS person who had a circa 1970 DP environment and could not convince management to update the systems [CW, Feb. 3]. This DP professional has one of two serious problems: He is either ineffective in proposing the situation to management, or management does not recognize or feel that the DP function is important. The situation was addressed as though the DP professional were ineffective.

There are only two valid reasons why computer systems should be replaced: The existing computer systems are inadequate in providing the management functions of information they are employed to perform, or they are no longer cost justifiable.

Assuming that one of these is true and that these cases have been properly presented to management and refused, I would recommend that the DP professional make the choice of "shut up or get out."

Nicole A. Bianco
Consultant
Phoenix

Pick of the operating system litter

This letter has been nearly written several times. Each time I read your publication and see the continuous requests of users and data processing executives for an easy-to-use, hardware-independent operating system, I look for the accompanying article on the Pick Systems Pick operating system. I have yet to find it.

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I have wondered why *Computerworld* has not provided more coverage of Pick.

If each user or data processor would get information on Pick — or better yet, a system demonstration — there would be fewer people questioning the Unix system and more using the thousands of Pick applications.

James D. Sutorus
Vice-president
Magna Systems, Inc.
Raleigh, N.C.

A grown-up multiuser micro DBMS

I feel as though something is wrong. Reading "Local networks for micros still in infancy" [CW, Feb. 3], along with a myriad of articles defending, or attacking, various data base management system approaches to design, you would think the single-user micro station with a simple file management system is the only proven norm.

And here I sit, running a Televideo Systems, Inc. PM-16 multiuser system exclusively using Cosmos, Inc.'s 10-user relational DBMS, Revelation. We have been down only once, for all of three hours, in more than a year of 24-hour-a-day use. We are happy with our hardware and our software, both of which are serving our needs beyond our original expectations. What are we doing wrong?

Bruce C. Brothers
Automotive Radio Equipment Co.
Sante Fe Springs, Calif.

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 70. Medical/Legal/Accounting/Mgmt
 80. Educator/Journalist/Librarian/Student
 90. Other _____
3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant.
 A. Mainframes/Supermains
 B. Microcomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Office Automation Systems

VIEWPOINT

Systems analyst wanted: No programmers need apply

By EFREM G. MALLACH

From *The Boston Globe* Help Wanted section come the following advertisements:

"Systems analyst. Require strong knowledge of 4GL/DBMS. Should have three to five years experience in systems development, prototyping, programming specifications."

"Systems analysts. Candidates must have two to four years of business systems analysis or programming experience. Knowledge of the firm's business a plus."

Open any newspaper, and you will find the same. U.S. industry wants its systems analysts to be programmers first and anything else second. If you know how to program, fine; if you just know how the business works, forget it. We're talking about big companies here. Neither firm that placed the above ads runs a small shop that hires Jacks and Jills of all trades.

This state of affairs is both bad and avoidable.

Why is it bad? Let's look at what a systems analyst does. To quote a leading data processing textbook *Computers and Data Processing* by Harvey and Barbara Deitel:

"The systems analyst consults with users, the data processing department, management, customers, the company's suppliers, government agencies, hardware vendors, software suppliers and other companies that have developed systems to meet

similar needs. The analyst should be personable, an effective communicator, both orally and in writing, and knowledgeable about the business, its operations, government regulations, hardware and software."

Although many definitions exist, this one is typical. If a systems analyst is doing the right things — defining user needs so a system can be designed to meet them — data processing expertise is at the bottom of the priority list. On the other hand, if a systems analyst is actually using much data processing knowledge, chances are the analysis is getting short-changed.

Why has this happened?

■ Systems analysis is usually done by the MIS organization. Computer people feel more comfortable with other computer people. They are the ones doing the hiring.

■ There is a feeling that anyone can learn the business, at least well enough to analyze its systems and information flow. On the other hand, learning about computers is really difficult. The employer wants to make sure that new analysts know the hard stuff. This position may be held by managers in noncomputer areas who know about business but are not comfortable with computers. They reason that computers are more difficult to master.

The first of these reasons ought not exist. The second is equally senseless. It takes many years to

master a business. But the pure technical data processing expertise needed to analyze systems and procedures effectively can be learned easily.

In fact, it is easier — much as computer types hate to admit it — to learn as much about computers as a good systems analyst really needs than it is to learn as much about business as a good systems analyst really needs.

And, systems analysts with a solid business background will come up

with systems that meet business needs better. Systems analysts with programming backgrounds tend to come up with systems that meet the computer's needs. If you care about your company's future, which do

you want?

There remains the training issue. It is smaller than meets the eye. A former accountant/new analyst must be trained in computers, and a former programmer/new analyst must be trained in the business. The difference? Computer training is visible. People go to classes. They charge time to training. The costs come out of your budget.

Business training, on the other hand, can be hidden. It happens slowly as the former programmer takes to users.

The time is charged to system development, which has a longer schedule to cover this need. The costs come out of the system development bud-

get, which has been made large enough to cover them.

Unfortunately, hiding costs does not eliminate them. The cost of on-the-job training is real and large. And the largest cost of all is the easiest to ignore; by trusting systems analysis to computer people learning the business, you get systems that are not what they could be. Information is a key corporate resource. Information use can give you a competitive edge. Systems analysts who are less than expert in business issues will cripple your company.

The remedy

What, then, should managers do to avoid this situation? First, treat systems analysis as a discipline. It is one. It requires training, whatever the trainee's background. In fact, systems analysis requires training in its own methods even if a candidate is an expert in both the business and in data processing.

Second, recognize that computers are there to serve the business and not vice versa. Systems analysts should specify the systems the business needs. One does not have to be an expert programmer to establish technological and economic feasibility. Systems analysts can get technical information from data processing personnel as easily as they can get business information from end users.

Third, consider how much managers on the user side really know about the business and how long it took to acquire this knowledge. Can someone with programming experience pick up enough in a few months to specify your company's new information processing methods? Really? And — if you're the MIS manager — will you say that to the president?

MANAGEMENT MATRIX

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Systems analysts who are less than expert in business issues will cripple your company.

Marketing the dead bolt as a corporate asset

By ROBERT D. HARGROVE

Having just returned full of enthusiasm and ideas from a computer security conference, I took time to reflect on and review the security literature. Part of the problem of attending any professional conference is returning to one's workplace brimming with ideas only to run up against the same obstacles that existed when one left.

One of the first obstacles, indeed the most critical, is the notion that a security program can be successful only if it first has upper management's support. This seems obvious, and for those of us who practice security and realize the present and growing importance of information as a corporate asset, it would seem such support would be paramount to upper management, too.

What we may fail to realize is that each department has also been admonished to get upper management's

support. With everyone vying for the chief executive's ear, it becomes increasingly difficult to find an attentive audience. Security becomes just one more voice clamoring for limited resources.

Another obstacle often cited is that security must be "sold" to upper management and to the organization as a whole. This presents two problems. The first lies in the nature of the product being sold. Security is inherently unattractive. Other departments vying for corporate resources for microcomputers, information centers or fourth-generation languages can offer management tools that can be employed to increase corporate productivity.

Security, on the other hand, has all the attractiveness of a dead bolt lock. Its selling approach is mostly negative, convincing management of all the bad things that won't happen if it is employed. Even the words used to describe it — threats, violations, lockouts — are negative in nature. To management, it may be seen as overhead; to the user, it may represent a hindrance or even an imped-

ment to his job performance.

The second problem in selling security to upper management may lie in the skills of the seller. Most people do not enter the data security profession because of their sales skills. Most are technicians who, thoroughly convinced of the need for security and often disinterested in organizational politics, may find themselves

bewildered and frustrated. No one disagrees with them on the

need for security, but everyone is reluctant to commit resources to effect it.

One of the first things a security administrator can do to address these problems is to enlist the assistance of the corporate training department.

This union can be beneficial to the organization for several reasons. First, the training department ostensibly has the flip charts, the foils and the expertise in adult learning processes.

Second, it cloaks security with the mantle of legitimacy, making it part of the overall corporate training program rather than merely a technical issue resting in the depths of DP.

Also, security controls do not have to be viewed in a completely negative manner. Security's main function is not to control for the sake of control but to protect information. Data exists to be used, not to be protected.

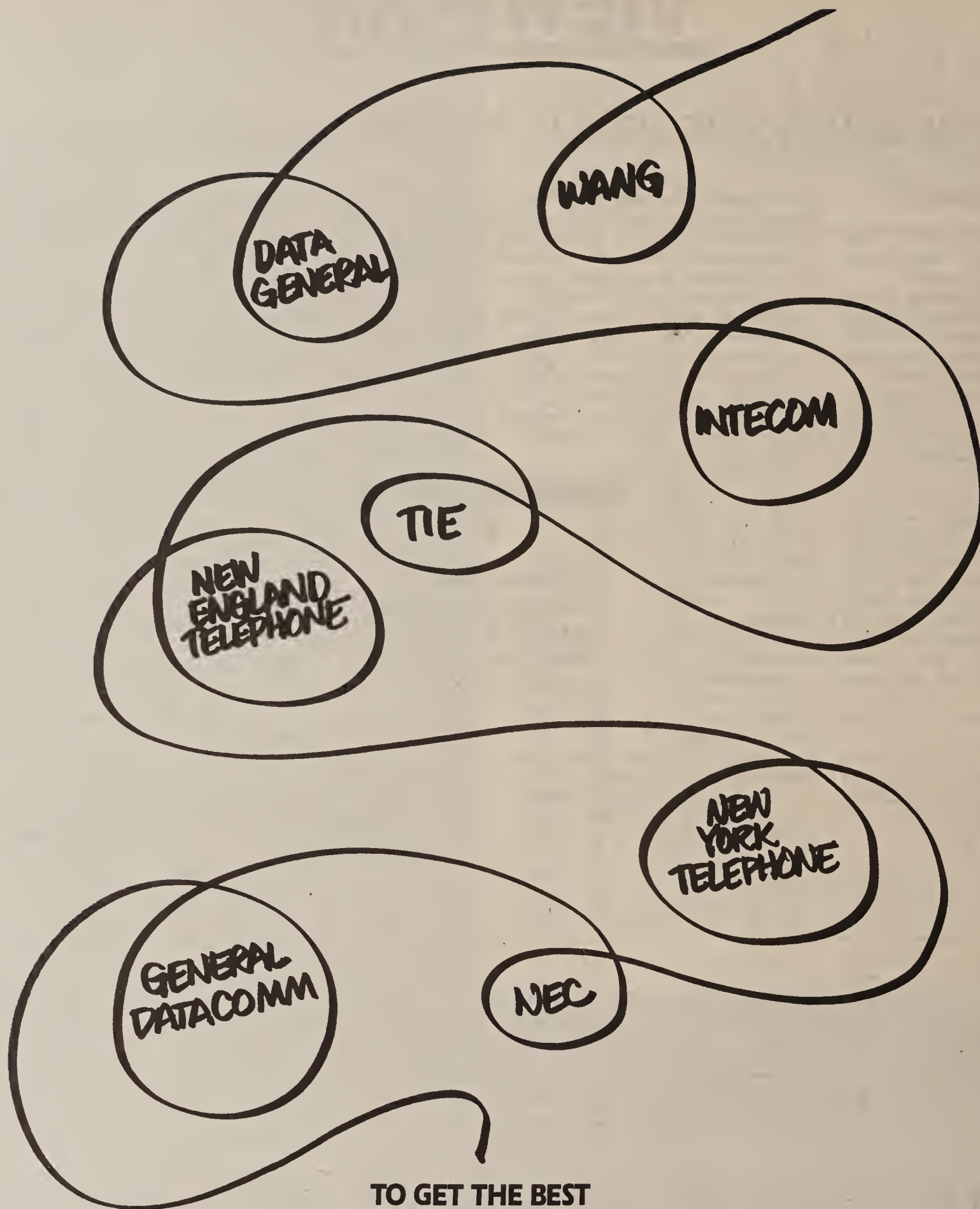
Indeed, security could be thought of as a large edit tool, as most data loss comes from data errors and omissions. This should give end users more confidence that their work will be "clean" and that only they will be responsible for their work.

Finally, there is one attribute that will assist the security officer more than any other: patience. Although one can quickly alter access to data, altering human behavior takes much longer. People's attitudes and motivations only change with time.

Although security officers must realize that they are competing for corporate resources along with everyone else, they might take heart that the need for security will keep growing inexorably as organizations come to realize the growing importance of information as an asset. For the present, they may have to be content with the role of corporate pest, wheedling, cajoling and educating anyone and everyone they can.

READER'S PLATFORM

Hargrove is a security and contingency planner at the University of Texas, Houston Health Science Center.



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COMMUNICATIONS



WIRE TAP
Daniel Minoli

Vendors define OSI standards

This year, the number of equipment vendors actively working toward implementation of the International Standards Organization's Open Systems Interconnect (OSI) model may have finally achieved critical mass. Industrywide acceptance of the protocols would put within reach the long-awaited ideal of interconnectability between any two computer systems.

The first three layers of the OSI architecture, which define functions that guarantee the delivery of packets of data across a network, had already gained wide industry acceptance during the last year or two. The more recent activity and debates have centered on the upper four layers, which deal with end-to-end transport and buffering, session management (logon, for example), presentation (codes, compaction, encryption), file transfers and other high-level services that are directly concerned with application and system software. Agreement on high-level protocols for these functions has come slowly, primarily because each vendor wants to retain those features that make its computer and communications products unique.

It is likely that each vendor will support two sets of standards: its own proprietary communications architecture (for example, IBM's System Network Architecture [SNA], Digital Equipment Corp.'s Decnet) and a common

See **VENDORS** page 22

Minoli is a lecturer with New York University's Information Technology Institute as well as a full-time data communications researcher and strategic planner.

Unix connections flourish at crowded Uniforum Show

By Jeffrey Beeler

ANAHEIM, Calif. — "The Unix Connections" proved a fitting title for this year's Uniforum Show, which took place last week in Anaheim.

There were roughly 200 vendors on the crowded Uniforum show floor, and everywhere visitors turned they found themselves face to face with some form of communications exhibit.

Vendors also put on joint demonstrations of how their products could exchange data and share resources across a common network, with Unix as the common operating system and Transmission Control Protocol/Internet Protocol (TCP/IP) as the common file-transfer and electronic mail system.

Probably the most extensive communications demonstration on the floor was a 3,000 ft-long Ethernet local-area network put together by The Wollongong Group. More than 100 devices from 30 exhibitors exchanged files and electronic mail over the system.

On one of the network's six subsections, Sun Microsystems, Inc. demonstrated how its Network File System permitted file-transfer among 15 vendors' computers using four operating systems: University of California at Berkeley's 4.2 Unix version, AT&T's Unix System V, Digital Equipment Corp.'s VMS and Microsoft Corp.'s MS-DOS.

Integrated Networking Solution

The Wollongong Group installed its Integrated Networking Solution as a gateway that enabled networked nodes to access the nationwide Defense Data Network (DDN). One of the accessible DDN computers was a Cray Research, Inc. Cray II supercomputer located roughly 400 miles north at the National Aeronautics and Space Administration's Ames Research Center in Mountain View, Calif.

Although the Cray II was theoretically

available to any machine on the Uniforum demonstration network, this fact was downplayed for security reasons. "The people at Ames weren't crazy about the idea of having large numbers of trade show visitors entering their system," according to David Langlais, Wollongong's director of product support.

Wally Wedel, a Unix specialist at NBI, Inc., viewed the linkup to a wide-area network as a significant departure from past Uniforums where "networking exhibits focused primarily on tying things together locally."

”

More than 100 devices from 30 exhibitors exchanged files and electronic mail over the 3,000 ft-long Ethernet local-area network.

NCR Corp. and National Semiconductor Corp. — are getting into the act for the first time."

At least one major hitch

The networking demonstration did encounter at least one major hitch. For about three hours during the show's opening day, a 1,000-ft section of the local network inexplicably died and left 10 of the 30 participating vendors unable to exchange files.

After measuring the electrical resistance at certain key points in the network and checking for abnormalities, Wollongong's Langlais finally pinpointed the source of the trouble: One of the 30 vendor participants had severely crimped its Ethernet cable and thus disrupted the flow of electrical signals.

By 10 a.m. the following day, Langlais had corrected the problem and restored the local network to full operation.

NEW THIS WEEK

■ Adacom introduces Adalink

■ For more on this and other new products, see pp. 67-84.

INSTANT ANALYSIS

"Yes, IBM will support industry communications standards like the Integrated Service Digital Network and Open Systems Interconnect. The question is, How well? IBM has a long list of Systems Network Architecture development tasks, of which ISDN and OSI are just two. Even IBM has a finite budget."

— John McQuillan, president, McQuillan Consulting Co., Cambridge, Mass., during an interview

PBX, local-area net hybrid meets firm's voice/data needs

GATX upgrades its Centrex with David

By Eddy Goldberg

CHICAGO — After investigating private branch exchanges and local-area networks, \$875 million diversified transportation and financial service company GATX Corp. chose a hybrid product that delivers the capabilities of both PBXs and local-area networks.

The Information Manager network from David Systems, Inc. of Sunnyvale, Calif., enabled GATX to provide high-speed data links between dozens of microcomputers and terminals as well as advanced telephone functions such as call waiting and call

forwarding — all through the company's existing Centrex service and phone lines.

The Information Manager, sometimes described as a PBX-based local-area network, acts as a front end to the company's Centrex service.

A David-Adapter hooked up to a David-Set telephone set provides a link between the David-Manager and data devices such as asynchronous terminals or an Ethernet local-area network that provides 1M bit/sec. communications among a group of IBM Personal Computers. Microcomputers linked to the David-Manager via ordinary RS-232C ports transmit up to 64K bit/sec.

An expert familiar with the product, Jeffrey Kaplan, senior industry analyst for communications research

at International Data Corp., Framingham, Mass., explained, "The David system adds digital capabilities to a Centrex, making it competitive with digital PBXs. While not a PBX, the David network is what a fourth-generation PBX was meant to be — that is, digital, nonblocking with voice and data transmission capabilities, circuit and packet-switching and local-area networking through a distributed architecture."

Communications solution for companies

David designed the Information Manager as a communications solution for companies, like GATX, that need to support sophisticated voice and data communications applications that a Centrex cannot handle effectively but that are not yet ready

for the major investment of installing fourth-generation digital PBX switches.

GATX evaluated data PBXs, digital PBXs and local-area networks as possible solutions, according to the following criteria:

■ Utilization of existing twisted-pair wiring for both voice and data communications.

■ Support of industry standards.

■ Minimum data transmission speeds of 9,600 bit/sec., preferably 1M bit/sec. or more.

■ Support of existing equipment including IBM and compatible personal computers, asynchronous terminals and several printer brands.

According to GATX manager of planning and administration, Robert

See **NET** page 22

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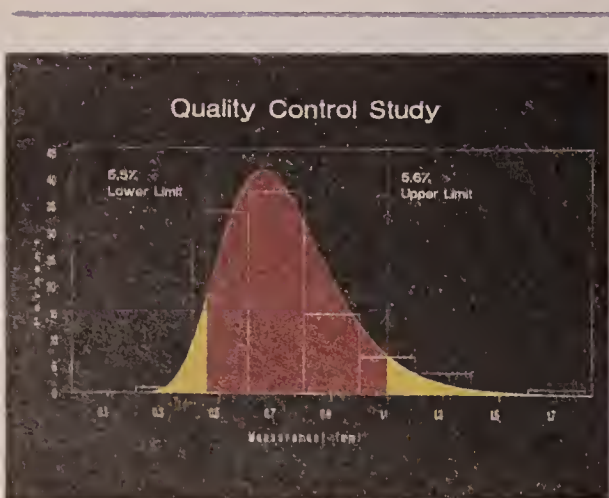
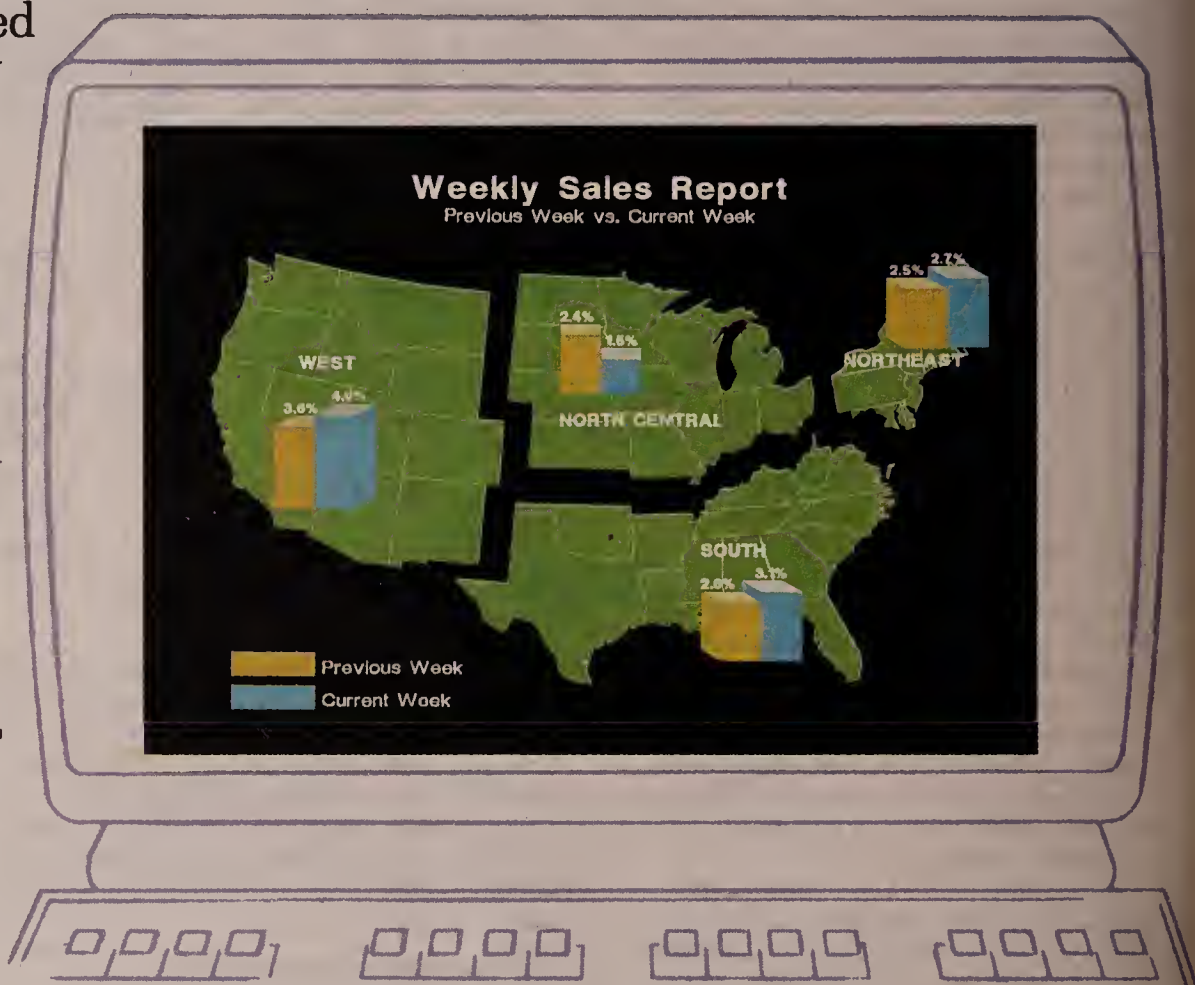
Here, in one system, are integrated tools for any computing task. For any environment, from personal computers to mainframes. For seasoned professionals and new users alike.

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But ease of use shouldn't be confused with lack of power. We eliminated that trade-off by giving programmers everything they need to handle computer performance evaluation, matrix programming, and applications development.



```

AF:
Command >>>

Departmental Reporting System

Place an "X" beside the appropriate options below.

Please indicate how you would like for the data to be processed.

X Produce Interactive Report      Copy Data on Diskette
  Print Locally                  Upload Data to Corporate File

To process data on the PC, choose a report format:

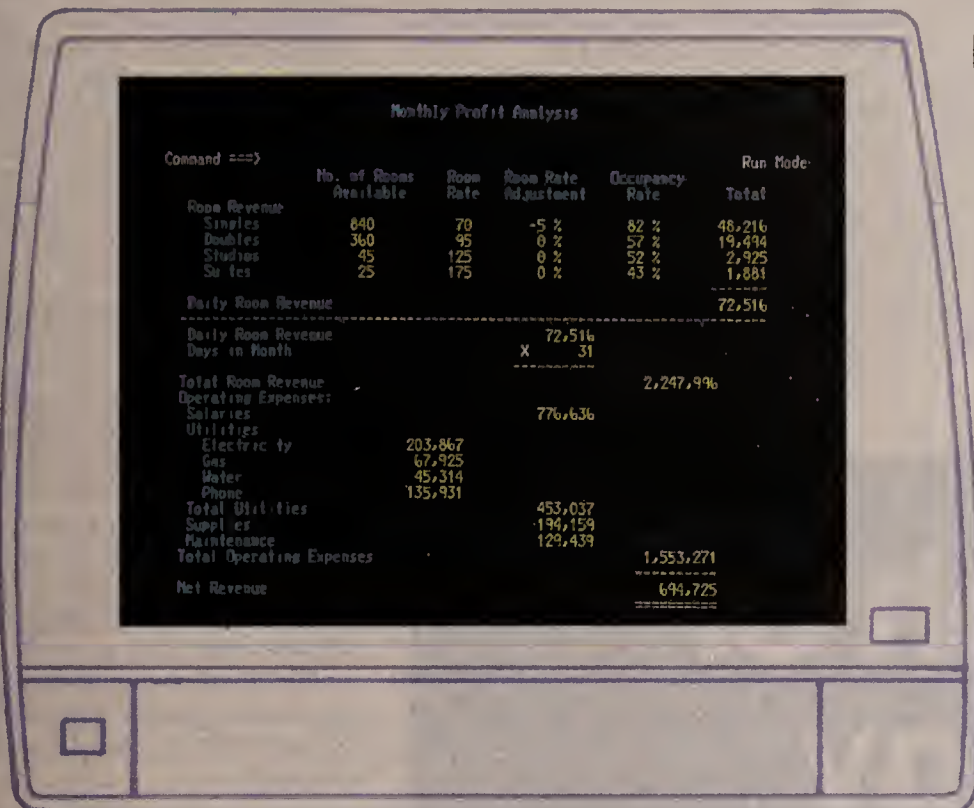
X Bar Chart
  Banner and Stub Report
  Frequency Table

To process data on the host, specify where the analysis results
should be placed:

SAS Data Set      Sequential File
DSM File          Output Window of PC

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SYSTEM



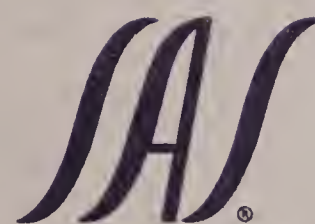
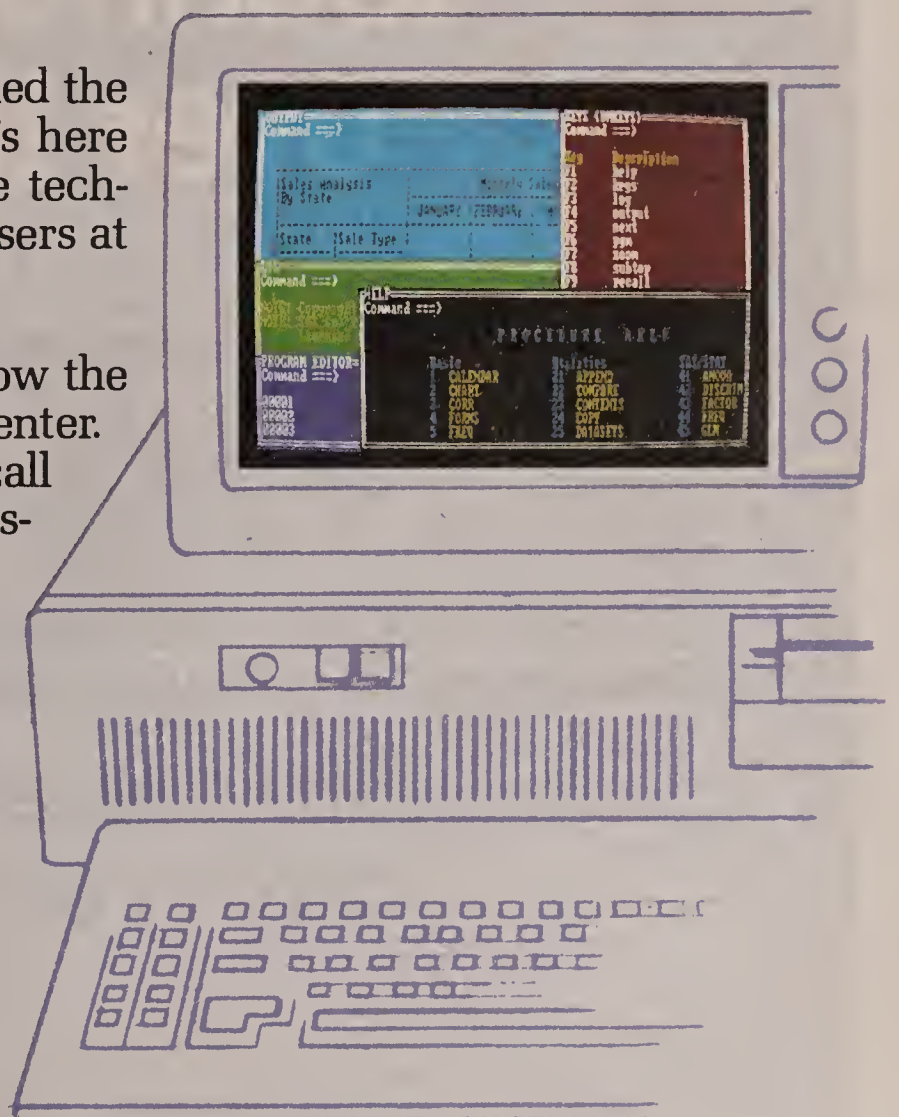
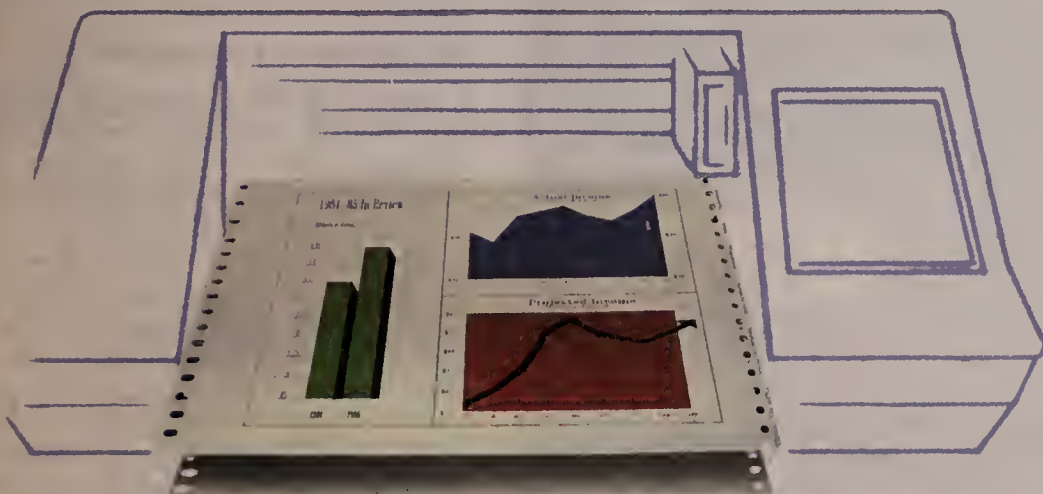
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COMMUNICATIONS

Vendors define OSI standards

From page 19

standard such as OSI, which could be implemented in a gateway linking two different vendors' products.

Among the dozens of recent vendor and industry group announcements related to the developing standard, the following four areas deserve special attention:

■ **Corporation for Open Systems (COS).** Approximately 20 companies in the computer and communications industry recently formed this organization, under the auspices of the Computer and Communications Industry Association. The charter is to monitor OSI and Integrated Services

Digital Network (ISDN) standards. The corporation will develop specifications for implementing FTAM (OSI Level 7) and the X.400 electronic message handling features (OSI Level 6). FTAM could be available in 1986, X.400 in 1987. A week ago COS gained a powerful new member — IBM.

■ **IBM's progress.** IBM's support of OSI seems certain; still in doubt is how the vendor will adopt the standard. Various experts have suggested the following possibilities:

1. Differences between IBM's SNA communications protocols and the OSI standards may disappear by the time the OSI model is fully defined, sometime in 1988.

2. IBM could develop a gateway (possibly using its 3710 communications controller) between SNA and OSI environments.

3. If IBM perceives enough demand at home for OSI, it might introduce an OSI/SNA hybrid architecture sometime in 1987 or 1988. Such a product is rumored to be under development at IBM's Raleigh, N.C., research facility.

European government organizations and manufacturers have for some time been pressuring IBM to adopt industry communications standards such as X.25 and OSI.

Sometime this quarter, IBM reportedly will make available in Europe the Open Systems Transport and Session Support package, which implements OSI Levels 4 and 5 on IBM 370 machines under MVS.

■ **European support.** The European Community, a body of representatives from 10 European countries, is attempting to translate the OSI standard into a working struc-

ture for vendor-independent networks.

■ **On the factory floor.** General Motors Corp. and the Institute of Electrical and Electronics Engineers, Inc. (IEEE) have jointly been developing a version of the OSI standard specifically for the factory floor. During the Autofact '85 Conference and Exposition, held in Detroit, more than 20 major computer and communications manufacturers participated in a demonstration of GM's proposed Manufacturing Automation Protocol (MAP). IBM, DEC and AT&T are among the leading vendors that have endorsed MAP. But commercially available products to link these leading vendors' systems to a MAP network are still to come.

Industry adoption of the OSI model will be an important development for corporations that need to establish communications not only between different types of computer systems but also between the different communications environments of the factory floor, the engineering division and the business office. Employment of the OSI layers will facilitate migration to ISDN.

For these reasons, the increasing number of vendor announcements of OSI products is plainly good news for customers.

Net hybrid meets voice/data needs

From page 19

Fredriksen, his company chose the David Manager because "it provides the modern voice features of a PBX, the RS-232 connectivity of a data PBX and high-speed data speeds of a local-area network, all on a single twisted-pair wire."

A digital PBX would provide most of the above features, but the least expensive digital PBX that would meet the company's needs would have cost \$680,000, according to Fredriksen. The David system installation cost only \$154,000.

Of the 50 workstations now connected through the David network at GATX, six IBM Personal Computers are equipped with Ethernet local-area network boards from 3Com Corp., which has a software licensing agreement with David.

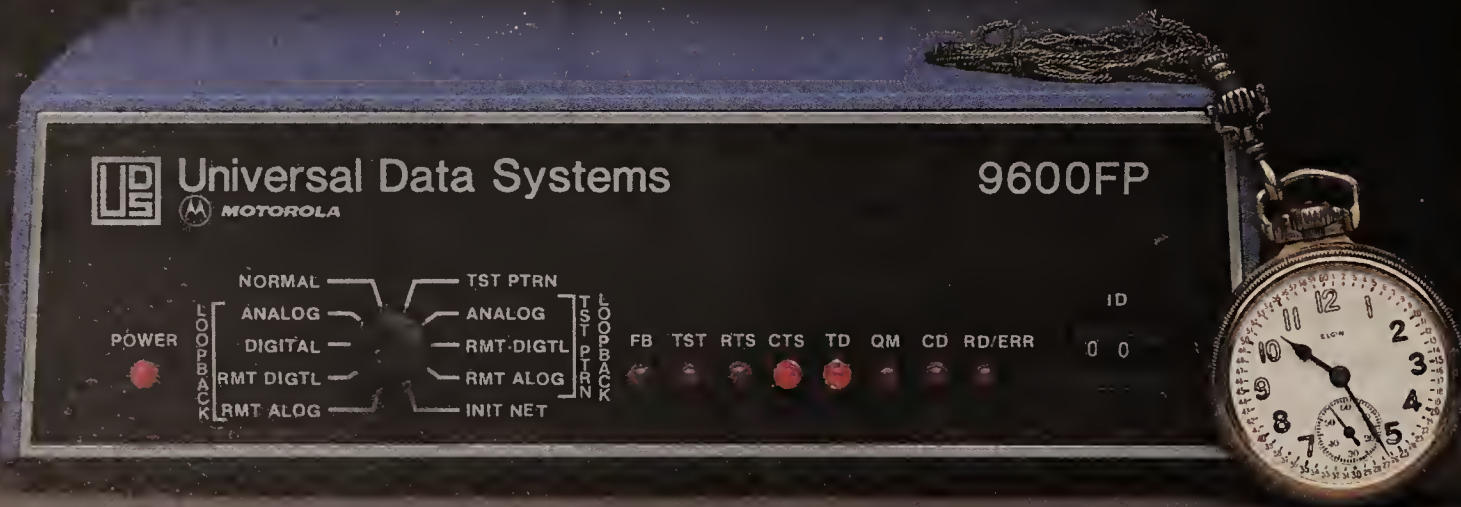
File exchange at 1M bit/sec.

The Ethernet connection enables the six IBM Personal Computers to exchange files at 1M bit/sec. and share expensive peripherals such as laser printers over the network. "The local-area network system is where we get the most savings because of the multiple shared-user facility," said Bill Uminowicz, manager of applications systems.

Microcomputers access the mainframe at 9,600 bit/sec. via RS-232C circuit switching and a Datastream Communications, Inc. protocol converter. Before the David installation, Personal Computer-to-mainframe communication took place at 1,200 bit/sec.

The David Information Manager also can be hooked up to AT&T's System 75 and 85 so that if GATX ever decides it no longer wants to pay an estimated \$250,000 to \$300,000 per year in Centrex fees, it can still upgrade to a digital PBX.

The triumph of technology over time



UDS 9600 Fastpoll cuts on-line training time 33%

Training time — it's probably the biggest deterrent to truly efficient throughput on any high-speed, dedicated data link.

The UDS 9600FP has cut on-line training time to 8 milliseconds, which is a 33% reduction of the previous 12 ms "industry standard." The result is a marked improvement in productive throughput and data link cost-effectiveness.

The device operates over unconditioned four-wire leased lines. In addition to its fastpoll capabilities, it can also function in the conventional CCITT V.29 mode. Integral test features allow for system performance evaluation and fault isolation within the communications link.

By incorporating LSI and microprocessor technologies, the UDS design also achieves size and power consumption advantages. For detailed specifications, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Phone 205/837-8100; Telex 752602 UDS HTV.

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SYSTEMS & PERIPHERALS



HARD TALK
James Connolly

What's in the cards for DEC?

As has happened so many times when a computer manufacturer makes a major announcement, every answer spawned more questions as Digital Equipment Corp. introduced three VAX systems and a VAXBI bus on Jan. 29.

But while other announcements have often raised questions about the quality of a product or a failure to address user needs, the speculation about DEC's announcement focused on DEC: Where is the company headed?

From the start — when rumors of a DEC announcement spread weeks in advance — few observers thought it possible that DEC would introduce another high-end VAX less than two months after the VAX 8600 line was boosted with the addition of the VAX 8650. That DEC would make an introduction threatening to make that line obsolete so quickly defies logic.

But DEC defied logic. Users and analysts seemed to welcome the VAXBI, the high-end VAX 8800 as well as the mid-range VAX 8300 and VAX 8200. Even some users with major investments in the year-old 8600 and the older VAX-11/780 line aired few complaints about those products being made obsolete. Instead, the speculation and conversation centered on DEC as a corporate entity and as a competitor of IBM, the position that DEC Chairman Ken Olsen has sought to solidify in the past year.

DEC officials avoided terms such as "mainframe" when talking about the 8800. But the system does fit in the

See **WHAT** page 24

Connolly is CW's senior editor of systems.

Canaan seeks to plug into a mid-range niche

Canaan Computer Corp. of Trumbull, Conn., recently introduced a 36-user departmental system intended to serve as a bridge bringing mainframe applications down to the department level for easier accessibility from personal computers and local processing under IBM VM/CMS. Canaan's product marketing manager, Richard Schreiber, spoke about the departmental systems market with Computerworld Senior Editor James Connolly.

How do you view the IBM-compatible market today?

First, we are not plug compatible. I want to differentiate that. We are application compatible with CMS applications that run under VM. We have designed our own 32-bit CPU, but we do 24-bit addressing, much like CMS does, in order to be totally software compatible.

We have designed for cost-efficiency and cost-effectiveness through remarketer channels as well as through the end users, with Intel Corp. Multibus for an I/O bus to keep our costs down.

We are software compatible, and that is the key because that is really where the investment is, particularly with a departmental-level system. You are talking about hundreds of thousands and millions of dollars, potentially, within an organization in software that gets ported down directly from the mainframe to our system. I would tend to say that almost all CMS software is standard portable software, meaning they are not doing any unique tweaking for channel access or channel activity. That typically is what you find in an IBM MVS environment where they are tweaking for transaction efficiency.

So, not being hardware compatible you do not have the added selling point of telling people that they can take their IBM peripherals and plug them right in?

I am not sure that necessarily is a selling point. The only peripherals that we

cannot plug in are channel-based peripherals. What we can plug in are the devices that users use.

We do not support IBM printers, tapes or disks. Now, in terms of value, you cannot do that with an IBM 4361 either, in terms of channel-based peripherals. . . . One thing of real value that we provide is open architecture, not only software open architecture but hardware open architecture. In particular, since we have the Multibus, it is very easy to layer in any new driver in our system. That also says that you could use front-end processors that could plug into the Multibus. So, we have OEMs right now who have some significant added value in terms of interfacing their own devices.

INTERVIEW



Richard Schreiber of Canaan Computer Corp.

Do you see a day when the company could be selling to the end user as well as on the OEM market?

Well, I think that over time we will have to move some percentage of our business toward going for the end user but clearly nothing in the short term.

Besides IBM, whom do you see as your competitors?

The primary competitor is IBM, but to a certain degree we view them as a noncompetitor because there is a void in the market that we feel we are filling directly. We are not the be-all and end-all of departmental computing. We are going after a niche and that niche is in larger corporate or organizational environments that are moving toward a three-tiered computing strategy to control users and the dissemination of data and information from the corporate mainframe, which has a tendency to be IBM at the top and predominantly IBM at the bottom.

Almost every MIS organization that we have spoken to wants to be able to keep a cohesive strategy of compatibility from the top down. They are finding that the

See **CANAAN** page 24

INSIDE

MDS Qantel introduces four mini-computers that support as many as 150 users/25

Pyramid Technology offers a departmental system that links personal computers to mainframes/25

NEW THIS WEEK

- Interscience Computer Services offers a line of tape subsystems
- Pinpoint Retail Systems introduces Utopia

■ For more on these and other new products, see pp. 67-84.

INSTANT ANALYSIS

"There is less concern today than ever before over what is in that box — it is 'what will it do for me.'"

— William C. Norris, founder of Control Data Corp. on the future of hardware and software

McDonnell Douglas makes additions to relational data base systems line

By James Connolly

IRVINE, Calif. — McDonnell Douglas Computer Systems Co. recently added eight models to its M6000 and M9200 families of relational data base management systems.

The systems run McDonnell Douglas' Reality operating system and are said to contain an instruction set designed for transaction processing and DBMS business applications.

Each of the three models in the M6000 family was designed to allow connection of up to eight terminals on a single 3,000-ft cable. The new M6000 models are the M6310, with eight to 16 ports and a price of \$26,500; the M6325, with eight to 32 ports and a price of \$31,500; and the

M6527, with eight to 48 ports and a price of \$41,800. The systems support 512K to 1M bytes of main memory.

There are five new models in the M9200 series, the firm said. They range from the M9220, which supports 1M to 2M bytes of memory and 16 to 64 ports at a cost of \$89,950, to the M9256 with 4M to 8M bytes of memory, 32 to 208 ports and a price of \$399,500.

The company said the M9200 models are equipped with high-performance disk drives said to feature up to 30% better performance than earlier models, with disk capacities up to 520M bytes on the M9220 and up to 4G bytes on the M9256.

Multuser supermicro out

Universe 2600 based on Motorola's 68000

By James Connolly

FRAMINGHAM, Mass. — Charles River Data Systems, Inc. recently introduced what it says is the company's largest multiuser system, the 32-bit Universe 2600 supermicro-computer.

The Universe 2600, based on the Motorola, Inc. VMEbus and 68000 microprocessor, was designed to support more than 100 users simultaneously or 1,064 serial communications devices. According to the company, it is available with up to 10M bytes of main memory, 1G byte of disk storage and 20 VME

board slots for user configuration.

Daniel J. Capone Jr., vice-president of marketing and sales for Charles River, noted that the system provides OEMs with flexibility as they design systems because the product uses an industry-standard processor, bus, network architecture and operating system.

Charles River officials claimed the Universe 2600 executes 1.25 million instructions per second with zero-wait states. It runs Charles River's UN/System V, which is based on AT&T Unix System V, and Charles River's UNOS real-time operating system. A base configuration with 1M byte of memory, a 45M-byte ¼-in. streaming tape drive, a 140M-byte Winchester disk drive and four serial ports costs \$29,900.

SYSTEMS & PERIPHERALS

Canaan plugs into mid-range niche

From page 23

users are demanding access to the data bases and, in many cases, the applications that are on the mainframes, which is what has caused the void for the departmental computer to fill. DEC clearly is a competitor. They have a fine integrated office system with All-In-One. But we are not going directly into the integrated office environment. . . . You cannot take an existing IBM application that has been written in-house and move it directly down to a minicomputer. You are going to have to have the organization learn that operating system, recompile the programs, relink

everything, run it and maintain a totally separate software piece.

If there is going to be a three-tiered computing organization with IBM at the top, IBM at the bottom and Caanan playing a key role, why is it not a big gamble to go with a company like Canaan, which does not have a long-term track record like IBM or even like DEC?

The solution is here and here now. It is compatible. You don't have to exert additional resources. The risk is just the cost of the hardware. The software that ports over goes back up to the mainframe at any time. So we have minimized the risk for an end-user organization, and the compatibility is absolutely paramount. Now, there are other features that we have. I think those make Canaan a very salable, competitive product.

What allows us to fit in is the fact that we are compatible. We allow major organizations that are trying to put together cohesive information strategies to implement those strategies today.

What is the risk for you if IBM suddenly boosts the 4361 or builds up the System/36?

We do not find the System/36 a competitor, particularly for the same reason we don't find the minis a direct competitor. It will not be able to run the applications that are running currently on the mainframe, other than a select number of third-party applications. If IBM did something with the 4300s, we feel that we would have a differentiation by virtue of price, by virtue of features and by virtue of timing. Granted, we could play hypothetical and say,

"What if they do this tomorrow?" But we feel we have enough intelligence on what they are doing to know that it will not be happening tomorrow or even this year.

What it does for us, even if they announce it and do not bring the product out immediately — which is their typical direction — is that it will become even more beneficial for us because it will drive that much more software to be converted to run under CMS.

What's in the cards for DEC?

From page 23

middle range of the mainframe scale, and the migration path that VAX offers could provide an edge for DEC in DP shops that are growing from the superminicomputer world into their first mainframes.

The users who praised the 8800 apparently are willing to sacrifice the used market value of their older VAX CPUs in exchange for DEC's commitment to maintaining its VMS compatibility up and down the VAX line, protecting the customer's software and peripherals investment.

The VAXBI appears to be DEC's bus for another decade, leaving room for growth in terms of processing power and numbers of users well into the 1990s. The bus fueled speculation about DEC soon allowing users to string together numerous VAXs to attain processing speeds not possible with existing VAX clusters, to smooth upward migration paths and to open up parallel processing capabilities.

The announcement left two significant gaps in the DEC product line, gaps that users and analysts agreed will be filled shortly. Those gaps include the range between the dyadic 8300, rated at 1.9 million instructions per second (MIPS) and the 4-MIPS 8600. Also, the users predicted that DEC will add VAXBI capabilities to the existing 8600 line.

In addition, the VAXBI may be a tool with which DEC can manipulate the OEM and DEC-compatible markets.

Elizabeth Levy, an analyst for the San Jose, Calif., market research firm Dataquest, Inc., noted that DEC has the power to pick and choose which third-party developers and others who "survive in the shadows of DEC" will be licensed to use the bus. She added that it is that type of control that IBM maintains on third-party vendors.

The names of DEC and IBM ran together several times more in the days after Jan. 29.

In some cases, the names fell together in connection with communications, as observers noted that DEC may have learned a lesson from IBM's earlier competitors that did not recognize the need for or could not implement communications with IBM.

In another case, DEC started to look like IBM when the subject of leasing arose. Not only did DEC say it plans to lease some of the software for the 8800, but also several users told of DEC salesmen hinting that leasing is the way to go in the hardware arena since DEC said it expects to replace CPUs every two years.

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SYSTEMS & PERIPHERALS

MDS Qantel presents mini series

By James Connolly

HAYWARD, Calif. — MDS Qantel, Inc. recently introduced four minicomputers designed for faster performance in smaller boxes while maintaining compatibility with existing Qantel systems.

The four new systems support up to 150 physical terminal connections, with two of the products providing "64-bit-like" processing power through use of Qantel's Q31 single-board processor.

In addition, Qantel said, the Q31 processor is available as a replacement for Qantel's Q29 and Q30 processors in existing Qantel Systems 10, 20 and 40 to provide 1.8 times the processing power of the Q30 and three times the power of the Q29. The Q31 upgrade costs from \$12,000 to \$14,000.

The four new systems are the Qantel Systems 45, 55, 58 and 78. The Systems 55 and 58 are based on the Q31, the System 45 on the Q30 and the System 78 on the Q264.

The System 45 features a memory capacity of 1M byte and expands to support eight to 10 intelligent workstations in high-use applications and up to 32 connections. A basic system costs \$20,000.

A basic System 55 costs \$42,760. That system can be expanded to support 4M bytes of memory, 64 physical connections and 15 to 16

workstations in high-use applications.

The System 58 supports a maximum of 64 workstations and 16M bytes of memory. A basic system costs \$73,670.

The System 78 handles up to 150 terminals — 40 in high-use environments — and 16M bytes of memory. A basic System 78 costs \$123,430.

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Departmental system debuts

By James Connolly

MOUNTAIN VIEW, Calif. — Pyramid Technology Corp. has announced Pyramid Workcenter, the first product in what it says will be a family of devices designed to connect departmental personal computers with corporate data centers.

"The most important element of this system is that it is transparent to both the desktop and the mainframe," said E. David Crockett, president of Pyramid.

Based on Pyramid's 32-bit CPU, Workcenter includes 8M bytes of memory, up to 600M bytes of disk storage, intelligent I/O controllers, a 40M byte/sec. bus and a 1,600 bit/in., ½-in. tape drive.

Pyramid officials said the Workcenter can communicate concurrently in desktop and mainframe protocols to provide desktop machines with services such as remote backup, data base management and network security. File sharing is through Pyramid's implementation of Sun Microsystems, Inc. Network File System, according to the company.

It runs Pyramid's Dual-port, which supports AT&T Unix System V and University of California at Berkeley Unix Version 4.2. Communications options include up to 32 RS-232 ports, Ethernet, X.25, remote job entry, Arpanet and Network System Corp. Hyperchannel. It costs about \$100,000.

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Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than \$7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it

prints on virtually any cut sheet paper, including overhead transparencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counter-productive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and

dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been

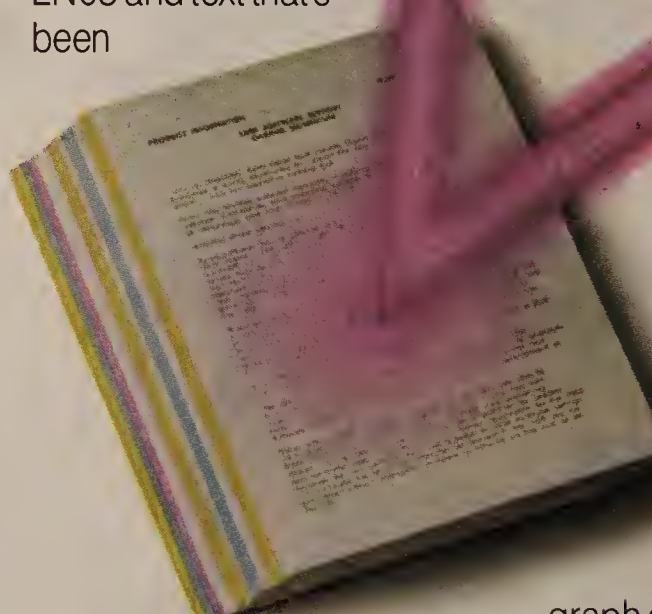
To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom

designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.



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The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

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Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract

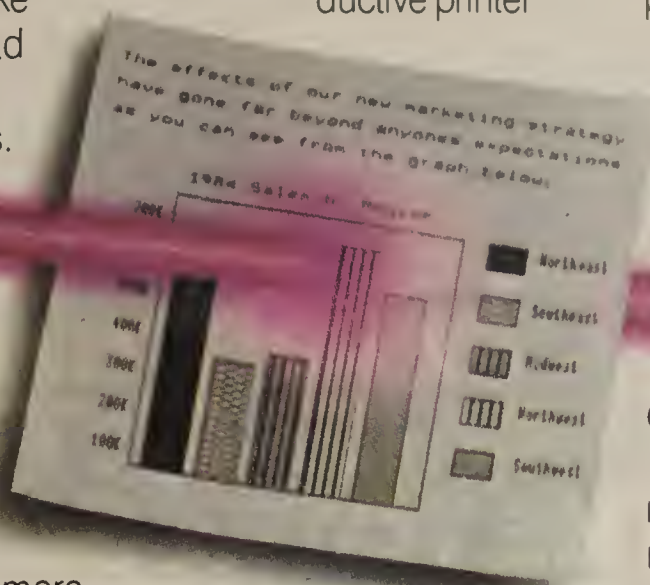
and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing. And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities.

A professional look. Which makes the LN03 the most productive printer



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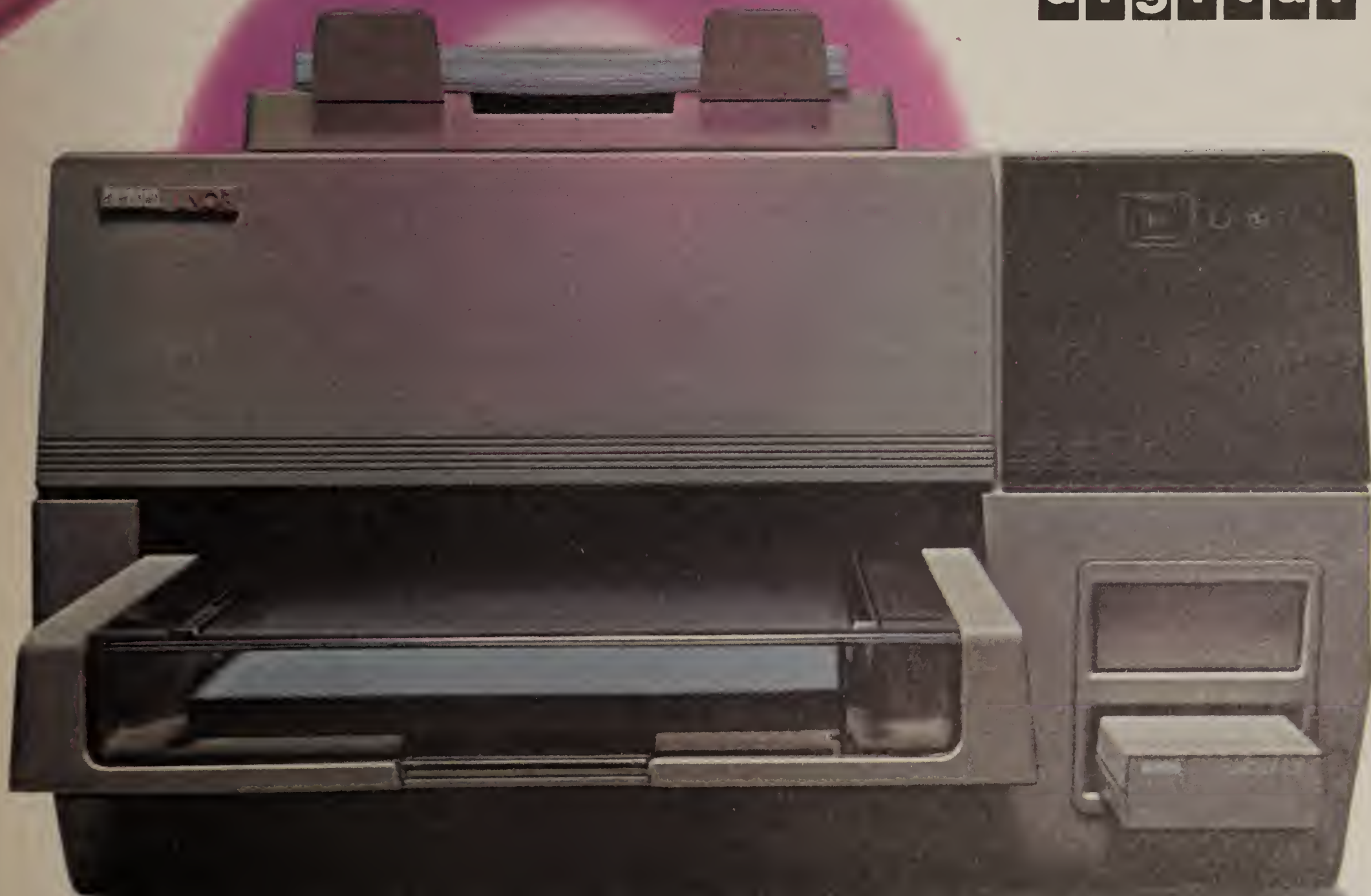
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SOFTWARE & SERVICES



SOFTLINE
William Inmon

The duel over dual data bases

SECOND OF TWO PARTS

The first issue of the dual data base involves technology. Will any data base management system serve both performance and flexibility needs? Even if a DBMS is available to serve both needs, can the DBMS serve the needs for high performance and flexibility at the same time with the same data?

Separate from the issue of whether a single DBMS can serve all data base needs is the larger issue of the basic differences in the uses of data base. Central to the question of the dual data base — not dual DBMS — is the trade-off between the redundancy that is inherent across dual data bases vs. the advantages of dual data bases.

The primary division of data base use comes along the lines of on-line, operational systems and flexible, easy-to-build decision support systems (DSS). Consider the following basic differences between the operational and DSS environments:

- Operational data is usually stored and accessed at a very detailed level; DSS data is usually stored and accessed at a summary level.

- Operational systems require that detailed items of data be accurate up to the second; DSS systems often operate on data that is accurate only up to some moment in time, meaning that the data is extracted and exists as a snapshot.

See **DUEL** page 32

Inmon is a director at Coopers & Lybrand in Denver, a noted author on the subject of data base design and a regular contributor to Softline.

Cobol 85 compiler awaited

Tandem eyes April debut for ANSI standard tool

By John Gallant

CUPERTINO, Calif. — The first fully Cobol 85-compatible compiler may be available as early as April 1.

Tandem Computers, Inc., headquartered in Cupertino, has targeted that date for the release of a Cobol compiler and runtime library dubbed Cobol85 [CW, Sept. 26] for use with its Guardian 90 operating system on Tandem's Nonstop II and TXP processors. The company said it believes Cobol85 will be the first generally available compiler that conforms fully to the new Cobol language standard, known as Cobol 85, approved late last year by the American National Standards Institute (ANSI) and the International Standards Organization [CW, Sept. 16; Sept. 23].

Participants in the drafting of Cobol 85 agreed that Tandem's compiler will be a pioneering effort. Jerome Garfunkel, founder of Litchfield, Conn.-based Jerome Garfunkel Associates, Inc., a Cobol 85 consulting and training firm, and a member of the ANSI Cobol committee, said vendors like IBM and Digital Equipment Corp. have offered compilers that boast many of Cobol 85's features. "But as far as I know,

this is the first fully compatible compiler," Garfunkel said. "A lot of other products come close, but this is the first exact implementation of the standard."

Because the federal government has given vendors that sell to government agencies 18 months to provide a Cobol 85 compiler for use with their hardware, most major manufacturers will offer such products by late 1986 or the first quarter of 1987, Garfunkel said.

Tandem's Cobol85, which will be licensed at a monthly fee of \$300, supports all of ANSI's required standard modules including the nucleus, sequential and relative I/O, indexed I/O, sort/merge, interprogram communications and source text manipulation. According to Donald Nelson, senior software designer at Tandem and chairman of the Codasyl Cobol Committee, Tandem has chosen not to implement optional modules of the Cobol standard such as the report writer and segmentation modules.

Corinne Robinson, product manager for languages and tools with Tandem, said the company would not divulge the number of Cobol85 beta test sites or the installation base of the Guardian 90 operating system. She said Tandem currently has 1,000 customers, 70% of whom use the company's older Cobol 74-compatible compiler. "Ob-

See **TANDEM** page 32

Cincom revamps Net/Master

By Eddy Goldberg

CINCINNATI — Cincom Systems, Inc. has announced a new release of Net/Master, its network management system.

Net/Master, a component of Cincom's TIS/XA integrated software architecture, allows simultaneous access to multiple sessions including IBM's IMS, CICS, TSO and Cincom's TIS/XA Communications Monitor. It also provides network security and subsystem access, high-speed file transfer between distributed sites, and it aids in the automation of network operations.

Release 1.5 enhancements, according to Data Communications Product Manager Vicki Duckworth, allow users to take ad-

vantage of a single "skip" key to move directly from one application to another without having to sign on and off.

Duckworth said the new release also takes advantage of MVS/XA, decreasing resource use by using storage available above the 16M-byte line and reducing virtual storage requirements. Release 1.5 also features a locking function that allows users to password protect their terminals, effectively freezing the terminal while they are temporarily away.

Release 1.5 of Net/Master is a maintenance release that will be provided free to current users. New purchases begin at \$15,000.

NEW THIS WEEK

- Software AG upgrades Predict
- Boole & Babbage offers XPF/Cobol 1.2
- For more on these and other new products, see pp. 67-84.

INSTANT ANALYSIS

"The major hardware manufacturers waited for the ANSI committee to make Cobol 85 official. None of them were bold enough to prerelease a product. But now that vendors have the assurance of a standard, they are readying their compilers."

— **Jerome Garfunkel**, founder, Jerome Garfunkel Associates, Inc., on the status of Cobol 85 compilers

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Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE relational DBMS and application development tools, has announced a new program for software value-added resellers dubbed the Oracle Alliance program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and inherit a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do blindfold selling."

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them."

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX/VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's networking software links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

For additional information, contact Larry Harman, Oracle Corp., Central Region Headquarters, 55 W. Monroe St., Suite 3350, Chicago, IL 60603, or call (312) 726-1167. Interested VARs can also contact Oracle Corporate Headquarters in Belmont, CA at 1-800-345-DBMS.

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SOFTWARE & SERVICES

The duel over dual data bases

From page 29

■ Operational systems are for centralized processing, usually on a mainframe; DSS systems are usually built for individual use in a decentralized environment, often on a minicomputer or a microcomputer.

■ Operational data usually is static and singular in terms of its representation of the user's environment; DSS data is almost always dynamic, requiring multiple views of data in its representation of the user's environment.

■ Operational systems are used to run the company on a day-to-day basis. DSS systems are used to man-

age or direct the company looking at long-term trends and directions.

It is not reasonable to expect that the same data can or should be used so differently at the same time. Even if the same DBMS could be used, the demands on and uses of the data are so diverse that there must be a separation of data, even under a limited amount of processing.

In light of these very fundamental differences in the use and processing of data, it is not surprising that the world is turning to the dual data base approach. The demand for access and control of any given detailed data element is such that no processor can keep up with it. Thus at the crux of dual data base is a performance issue.

In an ideal situation, a single DBMS would be malleable enough to provide adequate facilities for both

types of processing. But historically, software has been designed to service one function or the other. Consider two extreme examples — IBM's IMS and Information Builders, Inc.'s Focus. IMS is a full-function, operational-oriented DBMS. IMS is capable of supporting a wide range of operational systems, providing adequate response time and availability. But IMS is difficult to change and is certainly not geared for speed or ease of development. Trying to mold IMS into a flexible, end-user tool is a very difficult task.

Focus is a user-friendly tool used to develop systems quickly. It is flexible and is aimed squarely at DSS systems. But Focus is capable of sustaining only a modest level of performance. The flexibility of Focus comes at a price, and the resources consumed by Focus preclude its use

as an operational tool.

If the fundamental differences in the operational and DSS environments are deep and if traditional software has its limitations, then the result is duplicate data bases — one serving the operational needs of a company and one serving the DSS needs.

The redundancy issue with dual data bases is a far cry from the redundancy issue of magnetic tape master files. In the case of magnetic tapes, the validity of any given data element at any moment in time is in question because of the existence of many occurrences of the element spread across multiple master files.

But with dual data base there is no redundancy within the operational environment. There is, in essence, a single system of record, and since there is no redundancy within the system of record, the type of redundancy endemic to the magnetic tape file environment is not a factor.

Instead, the redundancy that exists in dual data bases is across operational and DSS environments. But, given the very different needs of the two environments, redundancy is not a major issue. The summarized, historical nature of DSS processing does not mandate that up-to-the-date data be used. Indeed, most forms of DSS processing require that detailed data be frozen at some moment in time. The argument that up-to-the-second detailed data is the best foundation for DSS processing simply does not apply to most DSS applications. The implication is that redundancy across the DSS/operational environment is not only acceptable but desirable, and, for some types of DSS processing, it is mandatory.

If, indeed, dual data bases are the natural result of the deep differences in the use of operational and DSS data, the question remains: Is a dual DBMS strategy mandated? The answer is no. The optional solution is a dual data base strategy with a single DBMS technology if the single DBMS technology will satisfy flexibility and performance needs.

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Tandem Cobol85 compiler awaited

From page 29

viously, we'd like to convert all of them to Cobol85 in order to help them become more productive," Robinson said.

Though potential incompatibility between Cobol 74- and Cobol 85-based applications was a major issue that stalled adoption of the new language standard, Nelson said he feels conversion problems for Tandem users should be minor ones.

"As it turns out, the beta users have experienced little trouble, if any," according to Nelson.

He said there is little but professional pride to be gained by releasing the first Cobol 85-compatible compiler.

Garfunkel was more generous, saying, "Very few people are going to switch hardware vendors just to get a compiler," Garfunkel said. "But Tandem is gaining a reputation within the industry for being a leading-edge company. Tandem is hoping to extend that reputation to the user community."

MICROCOMPUTERS



SMALL TALK
Edward Warner

Smaller drives pose problem

What do you do when the industry leader introduces a portable personal computer with diskette drives that won't run your existing personal computer software? This is the problem that will face prospective users of IBM's long-awaited laptop portable when the machine is eventually introduced.

According to every source claiming familiarity with the new machine, its diskette drive or drives will be based on the 3½-in. diskette format already in use in the Data General Corp. DG/One and other popular laptops.

The new IBM laptop is expected to sell well, particularly among IBM's large installed base of desktop Personal Computers. But how will users get Personal Computer software and data diskettes, in the standard 5¼-in. format, to run on a machine with smaller drives?

For data diskettes, the answer appears to be simple: Copy them onto blank 3½-in. diskettes. Copying, though, is not so simple. It entails connecting either an outrigger 5¼-in. drive or a desktop Personal Computer to the laptop machine and then running the two packages along with a communications program.

Copying of a program diskette often requires breaking a copy protection scheme and can violate the software licensing agreement unless the program is being installed on a hard disk. Software licenses typically stipulate that the program is sold for use on one

See **SMALLER** page 35

Warner is editor of Computerworld News Service.

Teleconferencing tool bows

Tori Interceptor supports training, diagnostic work

By Douglas Barney

MINNEAPOLIS — Tori Corp. last month announced the Interceptor, a \$795 communications device that provides simultaneous interactive teleconferencing, remote training sessions or software and hardware support for up to 64 remote microcomputers.

"Anything you have ever been able to do at your PC by yourself, you can now do in conference," according to James Challenger, director of sales and marketing for Tori.

The Interceptor is a 1,200 bit/sec. modem that hooks up between the microcomputer keyboard and the CPU. This device intercepts keyboard input, passing it to remote microcomputers that contain the same device. Using Feedback, random-access memory (RAM)-resident software, both individual screens and files can be transferred with Interceptor, which mimics some of the functions of a conventional modem.

Once Interceptor is installed, the user calls the remote site, and the participants turn on their computers and load software such as Lotus Development Corp.'s 1-2-3. One user, dubbed the "master," is given complete control over the participating screens, which includes the ability to restart the remote computer, Challenger said. Through Feedback, control can be passed to different computers, allowing remote users to interact.

As with most modems, Interceptor uses conventional phone lines. If the phone line being used is needed for voice communications, the master can simply switch off control and leave the phone free for conversations. In point-to-point communications, the session can be reestablished with a flick of the Interceptor button. Reestablishing multiple-point sessions, however, requires Feedback software commands. If the session requires extensive phone conversations, Tori recommends the use of a second phone.

See **INTERCEPTOR** page 35



A computer on every belt is the goal of National Datacomputer of Billerica, Mass., which markets the 39-ounce, IBM Personal Computer-compatible Datacomputer. Unlike most laptops and hand-held computers, the \$1,700 Datacomputer comes bundled with a ring that provides secure connectivity to compatible belts.

Developers look into Windows

By Peggy Watt

SEATTLE — Software developers ranged from the curious to enthusiastic converts at Microsoft Corp.'s Windows seminar held earlier this month. Several developers announced or hinted at products that would not only take advantage of the Windows environment but would require it to run, while others simply picked up a tool kit and said they were there to look and listen.

Steven Ballmer, Microsoft's vice-president for systems software, listed 28 independent developers — including Microsoft's own applications software group — that have publicly committed to developing Windows applications or adapting current products.

See **DEVELOPERS** page 34

NEW THIS WEEK

- Kaypro consolidates its product line
- Quadram expands its Data-vue family
- For more on these and other new products, see pp. 67-84.

INSTANT ANALYSIS

"The buzz phrase in software for the next five years will be cooperative processing. The Lotus of the world will have to have some piece of software that runs on the main-frame in cooperation with software on the PC. In a way, they've got no choice"

— Frank Gens, International Data Corp.

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MICROCOMPUTERS

Developers eye Windows

From page 33

One of the biggest additions to the Windows supporter list is Lotus Development Corp., which recently announced it would develop some future applications that use Windows, and sent a small delegation of Jazz engineers to the seminar.

Ballmer said Lotus "didn't just give Windows its blessing" but helped determine such factors as keyboard interface.

Lotus signed an unusual, royalty-free licensing agreement for Windows, one Lotus official confirmed after the conference.

Intel another player

Another major player is Intel Corp., which, with its Above Board line, is "committed to working on hardware that can better support expanded memory," according to Richard Bader, operations manager.

"Windows has the ability to manage more programs than will fit" in memory, swapping them in and out of a random-access memory disk for faster access, Bader said.

Micrografx, Inc. of Richardson, Texas, which last July shipped the Windows-compatible drafting package In-a-Vision, promised to ship this month a lower end presentation graphics program that will not run without Windows.

Runs with runtime

A determined nonconvert to the graphical operating environment can still run Micrografx's new Draw product solo with Windows runtime software.

Company President George Grayson denies that Micrografx is closing doors by opening up with Windows. "We're expanding our horizons," he said.

"Before, we had to concern ourselves with device drivers and fonts. With Windows, we can concentrate on the application," Grayson added.

Paul Grayson, chairman and chief executive officer, said that Micrografx will align itself closely with Microsoft.

However, he observed, at \$99 for Windows, Micrografx will make money with its \$199 Draw package before Microsoft will recoup its investment in Windows.

A last-minute inclusion in the current version of the Windows product was the driver for a light pen provided by FTG Systems of Stanton, Calif.

The inclusion illustrates Windows' range of options, FTG President Douglas Lippincott said.

”

'Before, we had to concern ourselves with device drivers and fonts. With Windows, we can concentrate on the application.'

— George Grayson
Micrografx, Inc.

With Windows, Lippincott said, "we'll have 400 people who are going to go home and write light pen software without even knowing it."

Living Videotext, Inc. of

Mountain View, Calif., announced that its pending IBM PC-DOS version of a new business product being developed first for the Apple Computer, Inc. Macintosh would

also run only under Windows or accompanied by a Windows runtime accessory.

Absent from the conference — but a Windows watcher for some time —

was Symantec Corp. of Cupertino, Calif.

Symantec President Vern Raburn said he is uncertain whether Symantec will modify its Q&A data base manager for Windows.

Raburn noted that he supports the philosophy of a graphical interface, and he commented that the decision to bypass Windows support in Q&A's first version was affected by the many delays between Windows' announcement and its shipping.



MICROCOMPUTERS

Smaller drives pose problem

From page 33

machine, and, faced with the threat of lawsuits, employers are increasingly unwilling to cast a blind eye on the software pirate.

In all, the shift to 3½-in. drives "is going to upset a lot of people," warned Seymour Merrin, personal computer

industry analyst with the Gartner Group, Inc., a Stamford, Conn., research firm.

Merrin said it is unlikely that software publishers will be persuaded to sell their existing 5¼-in.-based customers a discounted copy of the package in 3½-in. format. Were the publishers to offer such a service, he said, they would be in danger of having their registered users buy the 3½-in. versions of the software at the discount for their friends.

For non-copy-protected programs and data diskettes, sometimes even copying from a large-format diskette onto a blank diskette in a 3½-in. drive will not provide a laptop-compatible version. This occurs because most IBM-compatible software is designed to display information on a 25-line VDT screen and not on the smaller LCDs in use in most laptop portables, said Paul Plourde, vice-president of information services at Bentley College in

Waltham, Mass.

Bentley College, which requires all 1,000 of its freshmen to use Hewlett-Packard Co. HP Portables, has found that IBM-compatible software from vendors other than HP will simply not display information on the HP laptops. The large-format software must first be run through a conversion program, Plourde said.

Of course, the best solution to this problem is for the maker of the new laptop to

put the software their customer will need most into read-only memory (ROM). Such was the solution adopted by HP when it incorporated Lotus Development Corp.'s 1-2-3, a word processor, and other software into ROM on its laptops.

Don't count on this from IBM, though. ROMs are not all that cheap, and the HP Portable has been faulted for its relatively high cost. Besides, IBM's strategy is to make software and other necessities "options" available at extra cost when possible.

Finally, one other factor encourages IBM not to put software into ROM in its laptop — it might slow the transition IBM hopes the personal computing world will make to 3½-in. drives.

Such drives already are the standard for IBM's Japanese Personal Computer. As IBM continues to buy more components from overseas sources, it is reportedly hoping to make the smaller drives a standard.

If this is true, then the issue of how to cope inexpensively with 3½-in. drives is not just a problem facing the prospective laptop computer user. Soon, it may be everyone's headache.

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It's time you knew.

Interceptor out from Tori

From page 33

Corporations can use the Interceptor for training and can have one instructor work with several employees at their desks simultaneously. The product also enables engineers to run diagnostic software to pinpoint problems in remote offices.

For example, a systems engineer can load a diagnostic program in New York, run the program in Boston and have the screen transferred back to New York, at which point he can determine the cause of the problem.

The Interceptor runs on IBM Personal Computers and compatibles, and the firm recommends 256K bytes of RAM.

The product can be used with any applications software running on these machines, although some problems may crop up with memory-resident desktop utilities.

Tori said it will enhance the product to run on mini-computers and non-IBM compatible microcomputers. Interceptor will also be enhanced to work with digitizer tablets so users can interactively manipulate images, according to Challenger.

The product is commercially available now with a 30-day delivery on orders, Challenger said.



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Product Spotlight

Edited by Barbara Wierzbicki

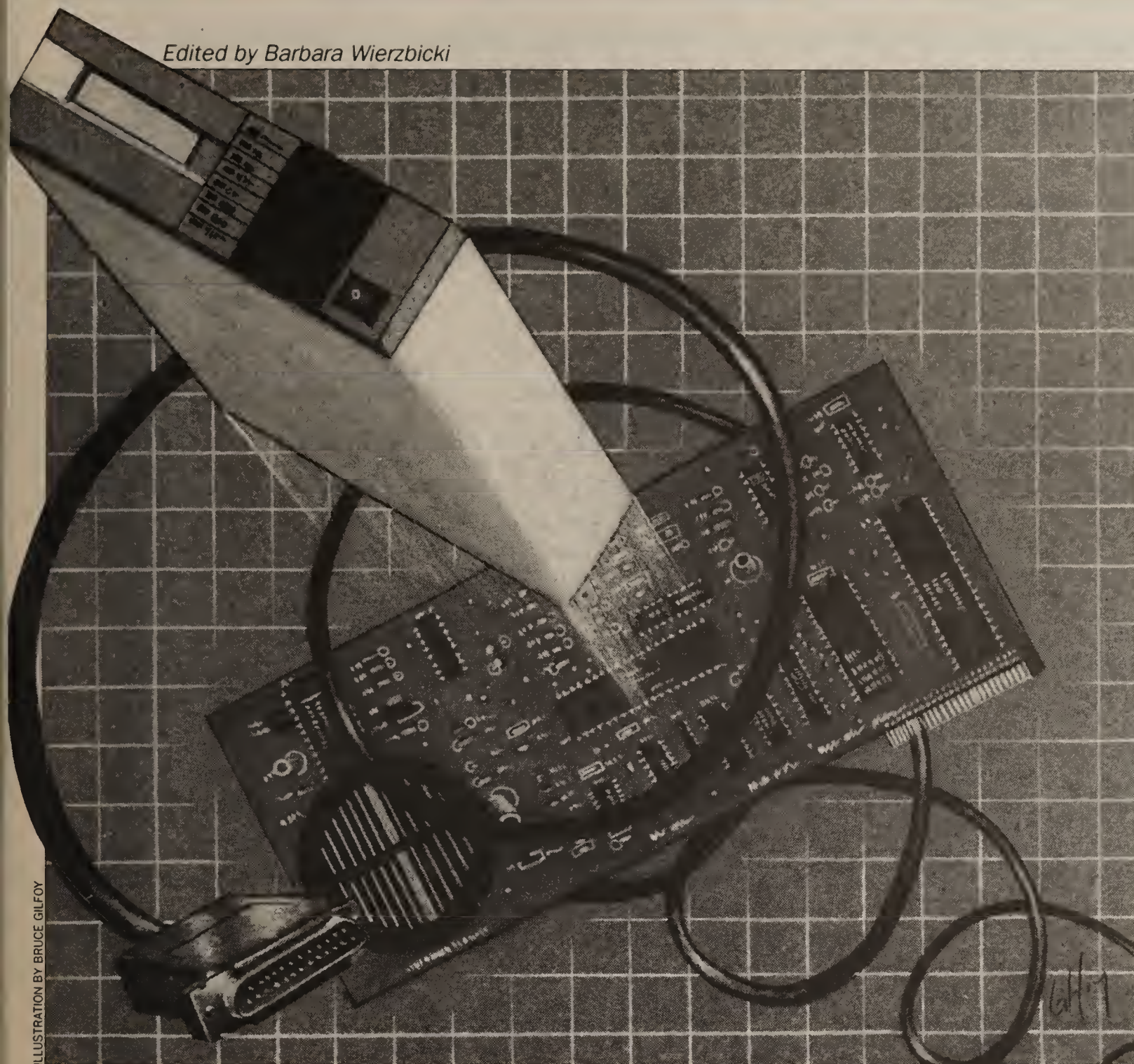


ILLUSTRATION BY BRUCE GILFOY

INSIDE

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Corporate users split over performance value of high-speed modems/46

Comprehensive 2,400 bit/sec. modem charts/49-50

2,400 bit/sec. modems

The blistering pace — and penalty — of speed

By MICHAEL MILLIKIN

Before personal computers hit the desktop, only a few select managers needed to venture into the jungle of telecommunications babble, perhaps more thickly overgrown with acronyms and alphanumeric abbreviations than any other area of the computer industry. But being natural communications engines, personal computers practically beg to plug into larger architectures, to hook up with other micros or to tap into the data hordes of on-line services. Subsequently, personal computer administrators now must add conflicting data communications standards to the jumble with which they already contend.

Enter the "new" 2,400 bit/sec. modem, one of the most coveted communications enhancements for personal computer users. "New" is a relative term, of course. Asynchronous modems operating at such speeds have been on the market since 1982. Unfortunately for the manager in charge of personal computer equipment, the burgeoning presence of the 2,400 bit/sec. modem adds even more variables to the equipment selection and

management process.

Yes, the 2,400 bit/sec. modems are hot — but are they cost-effective? Will they outlive their usefulness as vendors bring even higher speed offerings to market? In what applications does 2,400 bit/sec. data transmission enhance business productivity?

Mind-bending questions such as these aside, the new modems also cart with them a load of very real problems and glitches, mostly having to do with cross-vendor compatibility. A word to the wise: Before taking the plunge into 2,400 bit/sec. communications, be certain your needs dictate using higher data transfer speeds.

Users most apt to benefit from 2,400 bit/sec. communications include those who need to handle large file transfers involving personal computers, communicate over a wide geographic spread, use personal computers for remote-area networking or need long-distance, micro-based terminal emulation. Users of time-sharing services or value-added networks might find the extra speed beneficial as well, as long as the service does not boost its rates for 2,400 bit/sec. work.

Higher speed communications immediately

The newer modems should not be considered so much for their additional speed but for the extra intelligence and the increased use of error-checking protocols.

Millikin is an associate editor with Patricia Seybold's Office Computing Group, a market research firm in Boston.

Product Spotlight/2,400 Bit/Sec. Modems

Built for speed at 2,400 bit/sec.

Continued from previous page

affects the bottom line in the above applications by cutting transmission time and thus reducing the size of telephone bills.

For companies that regularly burn up the telephone lines with file transfers from, say, Boston to Seattle, 2,400 bit/sec. communications is a definite boon. In terminal emulation mode, for example, a personal computer running at 1,200 bit/sec. requires about 17 seconds to paint a screen. At a comparative 8.3 seconds for the same task, 2,400 bit/sec. transmission represents a clear improvement.

But seldom do you get something for nothing. The communications conditions within which most personal computers operate — asynchronous connections over standard voice-grade lines — are extremely vulnerable to disruption. Increasing the transmission rate also increases the hazard to the integrity of the data stream.

Thus, for applications where higher data transfer speed takes a backseat to error-free transmission (transfer of financial information, for example), a 2,400 bit/sec. modem with an error-correcting protocol such as the Microcom, Inc. Networking Protocol (MNP) might be

an appropriate choice.

These same error-correcting features, however, are also available in software programs such as Microsoft Corp.'s Access and certainly work on slower speed modems.

Which brings us to a very important point: Not all applications require 2,400 bit/sec. capabilities. For example, 2,400 bit/sec. is not an effective speed for interactively searching through many of the on-line data bases now available. Certainly, you could download informa-

over a very noisy telephone line.

Modems operating at 1,200 bit/sec. are not as extremely sensitive to line noise as are the 2,400 bit/sec. modems. Thus, a line that may be acceptable for carrying data at 1,200 bit/sec. may force a 2,400 bit/sec. modem to retransmit so many times that the effective speed gain is zero or even negative.

Although not very probable, given certain operating environments, this scenario is possible. More likely, extreme line noise could force the 2,400

commuter may have to change trains several times in the course of a journey, a call over public networks may be switched across a number of different lines before it reaches its destination.

Communications over leased lines is a luxury ride for the data — such lines are conditioned and carefully tended, reducing the potential for outside electrical noise disturbing the data signal. Public lines, on the other hand, are grossly noisy. The faster data moves through a line, the more susceptible it becomes to line noise. At 300 bit/sec., a modem needs about a 5db to 7db signal-to-noise ratio — the ratio of the strength of the signal vs. the noise on the line. At 1,200 bit/sec., modems need a 14db signal-to-noise ratio, and at 2,400 bit/sec., a whopping 21db ratio is required.

To combat the effects of noise, modems typically use one of three predominant methods of equalization: compromise (also called statistical), manual and automatic adaptive equalization.

Compromise equalization assumes that 90 percent of unconditioned phone lines have the same electrical characteristics and therefore doctors all lines in the same way. Manual equalization is more like tuning a TV set to get clearer reception on a given channel — the operator performs the equalization through controls on the modem. Automatic Adaptive Equalization (AAE) utilizes the increasing intelligence of modems. With AAE, modems monitor

”

*Seldom do you get something for nothing.
Increasing the transmission rate also increases the
hazard to the integrity of the data stream.*

tion more inexpensively at 2,400 bit/sec., but the cost incurred by browsing and searching at the higher speed could result in your paying more than if you had used the 1,200 bit/sec. rate.

Also, most of us cannot read plain text information that scorches past us at 2,400 bit/sec. Even if you had a microcomputer communications application that scrolls back through previous screens while maintaining a connection, you would be wasting expensive on-line time trying to ferret out what you had missed.

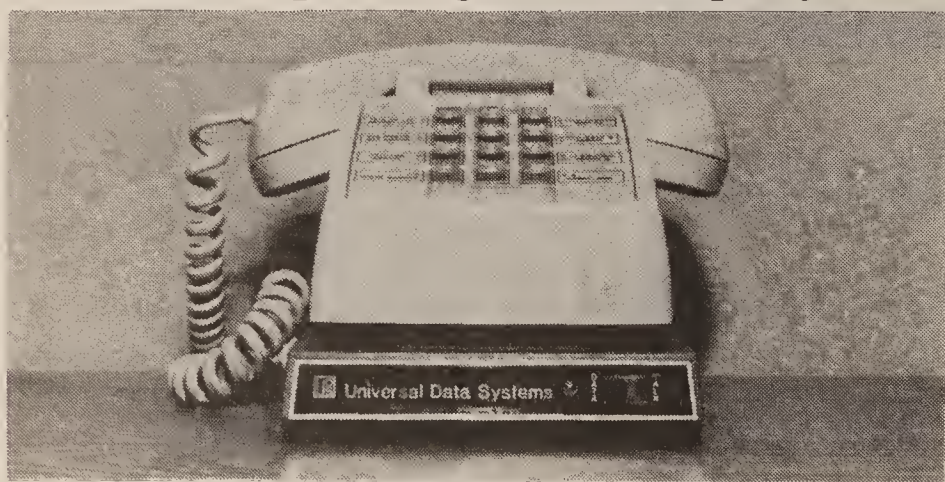
Nor does a 2,400 bit/sec. modem necessarily guarantee to transmit data faster than a 1,200 bit/sec. unit

bit/sec. modem to fall back to a lower speed, an option that carries its own set of difficulties, such as incompatibility problems.

In larger corporations, much of the higher speed data communications runs over specially leased and conditioned lines. Although expensive, these lines provide a direct, clear path for data — rather like a motorcade with police escort.

But communications over switched telephone networks (the public system to which you have access when you pick up the handset on an ordinary phone) is more akin to elbowing your way onto the subway at rush hour. And just as the

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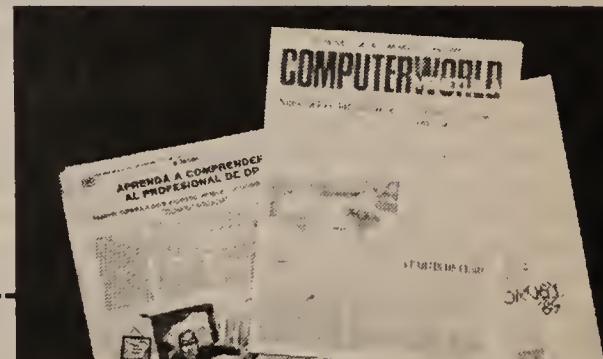


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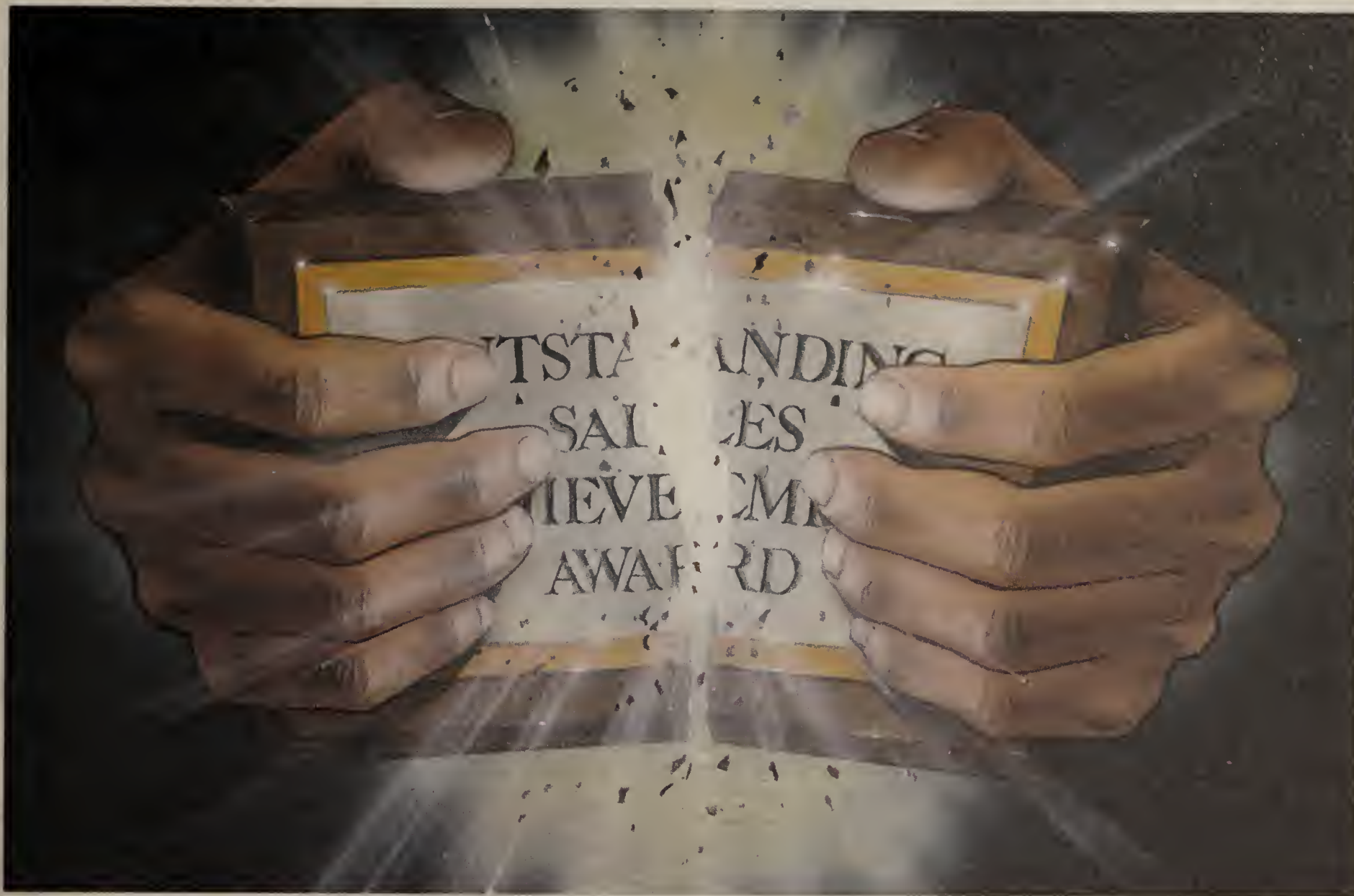
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Of course, other modems adjust their speed, too. But they typically have to cut their speeds in half, from 9600 bps, for example, to 4800. In fact, under some conditions, other modems will actually disconnect in mid-transmission.

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Product Spotlight/2,400 Bit/Sec. Modems

the line and perform whatever adaptive operations are necessary to neutralize the worst of the characteristics. Training time — the span needed to equalize a line — ranges from 25 msec to 150 msec.

In the switched network, not only are the voiceband lines noisy, but they differ in quality even among themselves. Thus, a call which is switched over several different lines has to endure not

just one set of poor conditions, but several. Automatic adaptive equalization becomes especially useful in such situations.

Some 2,400 bit/sec. modems use a combination of methods.

Hayes, for example, uses fixed compromise equalization in the transmitter and adaptive equalization in the receiver.

But even the increasing sophistication and blending

of equalization techniques proves insufficient in many instances. Error-correcting protocols that ride shotgun over the integrity of the data across the phone lines are also a must.

The two nonproprietary error-correcting protocols that are currently slugging it out in the marketplace are Tymnet, Inc.'s X.PC and the MNP.

These two protocols are locked in a popularity contest as each struggles to become a standard. MNP is the senior of the two, having been on the block since July 1983. Tymnet introduced its X.PC to the public in 1984. Unlike X.PC, however, MNP commanded a \$2,500 license fee.

The very existence of the license fee was enough to sway some vendors to the freely available X.PC. Bow-

ing to pressure and seeing heavyweights such as Microsoft and Hayes Microcomputer Products, Inc. throw their support behind X.PC, Microcom rescinded its licensing fee in December of last year.

Both protocols work well, and each has its selling points.

MNP is a trifle faster, permits switching from asynchronous to synchronous communications without breaking the link and boasts a virtual file system that can aid in file translation.

The X.PC protocol offers up to 15 concurrent virtual sessions over the same wire

”

By 1989, IDC says it expects the market for 1,200 bit/sec. modems to grow at 20%, while 2,400 bit/sec. modems are predicted to increase at 27.8%.

(the sessions, of course, must be with the same host) and is also very close in structure to the CCITT international packet-switching standard X.25. X.PC, can, in fact, be seen as an asynchronous version of X.25.

Vendors currently tend to offer one or the other bundled in their modems. In time, however, modems will probably boast at least the two — if not more — and will further pack the intelligence to decide with which of the protocols the modem at the other end is armed. While Concord Data Systems, Inc. for example, currently gives its users a choice of X.PC, MNP or ARQ, its proprietary error-checking protocol, it eventually plans to offer all three in the same box.

Until 1984, CCITT V.22 bis-compatible 2,400 bit/sec. modems were just another one of the many options in data communications available through established modem vendors. But when AT&T weighed in with its 2224 series of 2,400 bit/sec. modems, users and value-added network operators took notice. Something with the clout of AT&T behind it had to become a viable standard, didn't it?

Then, when Hayes released its Smartmodem 2,400, the personal computer community sat up. This standards setter dominates the personal computer communications marketplace so much that competing vendors sell their products by touting their "Hayes compatibility."

So when Hayes gave its
Continued on page 45



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Product Spotlight/2,400 Bit/Sec. Modems

Which standard is standard?

A computer system conceivably could operate heedless of compatibility with the rest of the world. Communications, however, mandates that at least two parties agree on a common set of conventions.

Although the Consultative Committee on International Telegraphy and Telephony (CCITT) is in name, at least, an international standards-setting group, its influence until recently stopped short of North America. AT&T unequivocally has set the North American standard for low-speed, full-duplex communications at zero to 300 bit/sec. with the AT&T 103.

In Europe, CCITT holds sway with its V.21 — officially for 200 bit/sec. but capable of handling transmissions at up to 300 bit/sec. So incompatible are these two standards that many European countries have outlawed the use of AT&T-standard modems, the tones from which seem to discombobulate European telephone billing systems.

Three players enter the game at 1,200 bit/sec.: AT&T, CCITT and Racal-Vadic, Inc. In the U.S., the dominant 1,200 bit/sec. standard is the AT&T 212A. By definition, the 212A modem is also compatible with the 103 standard, providing users with a fallback option.

The CCITT, however, has its own version of a 1,200 bit/sec. standard — V.22. No one familiar with this industry will be surprised to discover that V.22 and 212A are not compatible.

Racal-Vadic further complicates matters at 1,200 bit/sec. with its proprietary VA3400 specifications. Racal-Vadic modems using VA3400 are not compatible with 212A modems. And Racal-Vadic, being an established communications hardware vendor, has a sizable installed base.

Much to the relief of most in the industry, vendors have selected just one standard for 2,400 bit/sec. full-duplex transmission — the CCITT's V.22 bis. Proposed late in 1981, V.22 bis could be the first truly worldwide standard.

Even AT&T has bought into it, relegating its own version of a 2,400 bit/sec. standard — AT&T 2224 — to second place and offering V.22 bis on its new 2224 line of modems.

But even products supposedly designed to these specifications have their anomalies. The CCITT recommendations for V.22 bis specify V.22 for the fallback 1,200 bit/sec. modulation scheme.

Naturally, especially in North America, some vendors have decided to plug in the 212A scheme for fallback instead. This means that someone with a 2,400 bit/sec. modem that adheres exactly to the V.22 bis specifications would not be

able to communicate with a computer using a 212A modem, such as the ubiquitous Hayes Microcomputer Products, Inc. Smartmodem 1200.

Further complicating purchasing decisions, some vendors, such as Hayes, have enhanced their 1,200 bit/sec. modems, providing either 212A or V.22 compatibility at the flick of a dual in-line pin, or DIP, switch.

So the V.22 bis modem might not communicate with the Hayes Smartmodem 1200 on one desk but will talk with the Hayes 1200 on a different desk, provided that the second user knows enough to reconfigure the switches.

Future refinements may endow the modems with enough intelligence to solve the problems for themselves. Hayes claims that in limited laboratory tests, the Smartmodem 2400, when set to 212A (1,200 bit/sec.) mode, established reliable connections with a V.22-compatible 1,200 bit/sec. modem.

Similarly, the same testing found that the Hayes Smartmodem 2400 in V.22 mode could connect with another Smartmodem in 212A mode. But one should not, the company hastens to add, expect to get the same results oneself. Not yet, at least.

Capping the "can't" list, 2,400 bit/sec. modems using the full-duplex V.22 bis standard cannot communicate with half-duplex modems using either the AT&T 201 or the CCITT V.26 ter specifications — both different types of 2,400 bit/sec. asynchronous specifications.

Further complications arise from vendors choosing different methods of modulation — one of the prime functions of any modem.

Different modulation schemes produce different results. For example, in many instances, data actually moves through the pipes in both 1,200 and 2,400 bit/sec. modes at only 600 bit/sec. Communications vendors squeeze out the extra performance by using modulation schemes that pack more information into a single transmissible symbol.

Because different vendors use different modulation techniques at different bit/sec. rates, the potential for incompatibility abounds, especially when modems have to fall back to a lower speed.

Avoiding the above problems requires either careful product evaluation or buying products from only one vendor.

Unfortunately, the latter solution works best only when starting from scratch. And in the highly competitive modem market, dropping prices can lure unwary buyers into incompatible, multivendor purchases.

— Michael Millikin

Because different vendors use different modulation techniques at different bit/sec. rates, the potential for incompatibility abounds.

Product Spotlight/2,400 Bit/Sec. Modems

In search of speed: Creating faster, stronger modems

Even though the current crop of full-duplex 2,400 bit/sec. modems is just beginning to become a major presence in communications, some vendors are racing ahead to develop modems for even faster communications. But because of the electronic racket on voice lines, many in the industry say they do not believe that data communications at more than 9.6K bit/sec. is really feasible across those wires.

One of the more interesting — and widely supported — solutions to higher speed transmission over voice-grade lines comes from Telebit Corp. Making its debut at the National Computer Conference in July 1985, Telebit's Trailblazer modem boasts speeds of more than 10K bit/sec., even over the worst connections.

Telebit and Digital Communications Associates, Inc. (DCA), which markets the modem under the name Fastlink, both claim that the device attains speeds of more than 14K bit/sec. over good quality dial-up lines.

Telebit manages this feat by combining some sophisticated modulation and packet technology with an old-fashioned tactic: saturation bombing.

A modem signal generally does

not use all of the bandwidth available to it; the modem tends to use only two narrow channels to pipe its data across and back.

Trailblazer, however, uses as much of the wire's bandwidth as it can, blasting its signals over up to 512 carriers.

The Trailblazer modem packs some impressive hardware. Each device uses a Motorola, Inc. 68000 processor and a Texas Instruments, Inc. TMS 320 signal processor, carries a 1M-bit buffer and uses more than 70,000 lines of on-board code.

When two Trailblazers connect, the caller fires a broadside of 512 tones down the wire to test conditions. The answering modem analyzes the sounds and reports back on which segments of the bandwidth are usable.

According to Telebit, a call across transcontinental distances loses about 100 tones. On short hauls, all 512 frequencies are generally available.

The 68000 chip on the originating

modem then calculates the redistribution of power over the available tones to improve the signal-to-noise ratio.

Then, the modems determine the size of the packet, based on channel availability and the modulation scheme chosen. After the transmission of each packet, the modems recalculate.

On the average, Trailblazer manages to incorporate five bits per tone in this way.

If a burst of noise mars a packet, Trailblazer discards it and retransmits. If the problem becomes persistent, the modems read-

just the modulation and dynamically switch channels.

Like other modems, Trailblazer falls back to lower data transmission rates when the noise is unbearable.

However, unlike other modems that topple down by large chunks of 50% or more, Trailblazer slows in increments of 100 bit/sec.

Among its customers, Telebit lists ITT, which uses Trailblazer to trans-

mit engineering text and graphics; the *San Francisco Chronicle*; and Gifford Computer, a data services provider.

Users that commonly are forced to use very poor connections — such as offshore oil rigs transmitting over microwave — are also buying the Trailblazer because of the integrity of the data flow, says retired Brig. Gen. H. R. Johnson, Telebit's president.

The price for this scorcher? From DCA, the internal board version for a personal computer costs \$1,995; the stand-alone box costs \$2,395.

They are expensive and not something you would use only to tap into the local bulletin board, but they are certainly competitive with 9.6K bit/sec. modem offerings.

With products such as Trailblazer available, some large companies, thought by many to be the ideal targets for 2,400 bit/sec. modems, may leapfrog the lower mid-range speeds — 2,400 bit/sec. and 4.8K bit/sec. — entirely.

Of course, Telebit has introduced yet another variable into the whole standards mess. But one of the nice things about being first with a product and establishing a niche is that everyone else has to conform to you.

— Michael Millikin

”

Telebit Corp.'s Trailblazer modem boasts speeds of more than 10K bit/sec., even over the worst connections.



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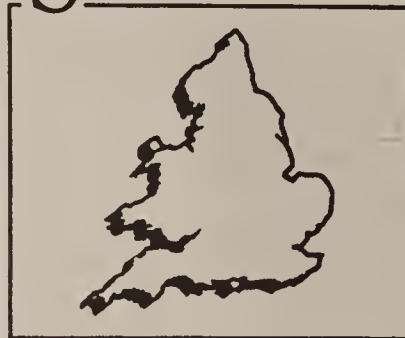
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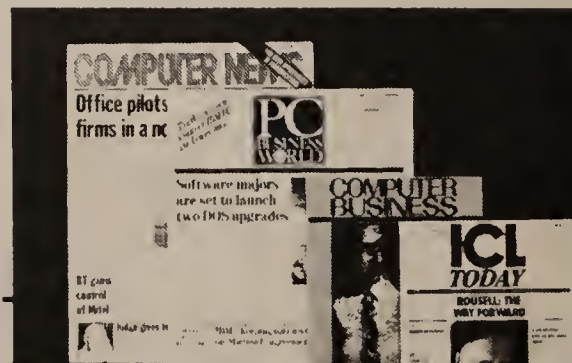
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Product Spotlight/2,400 Bit/Sec. Modems

Continued from page 42
blessing to 2,400 bit/sec. personal computer transmissions, many people assumed that 2,400 bit/sec. modems would supplant 1,200 bit/sec. units in the way that the 1,200 bit/sec. modems quickly elbowed aside their 300 bit/sec. predecessors. Such usurpation of market position does not seem to be in the cards, however.

International Data Corp. (IDC), a market research firm based in Framingham, Mass., reports that while the 1,200 bit/sec. segment of the modem market grew the fastest — 43% in 1984 — 2,400 bit/sec. full-duplex modems will soon eat into that growth rate. By 1989, IDC said it expects the market for 1,200 bit/sec. modems to grow at a relatively modest 20%, while 2,400 bit/sec. modems are predicted to increase at 27.8%.

“
If you want to buy a 2,400 bit/sec. modem — hang on for a while. With market share highly contested, pricing is extremely aggressive.

But while the percentage change may tip in the favor of the higher speed modems, the numbers of units shipped still point to the dominance of the 1,200 bit/sec. modem. IDC predicts that the beginning of 1990 will find more than seven million 1,200 bit/sec. modems in the field. By comparison, IDC expects to find some 873,000 2,400 bit/sec. modems in the field at the same time, a ratio of approximately 8-to-1.

Nevertheless, the market for the 2,400 bit/sec. full-duplex modem is sizable — a potential \$104.5 million in 1989, according to IDC. To help differentiate their products, many of which are based on the chip set from Rockwell International Corp., vendors are providing a number of value-added features, some of which are made possible by improvements in very large-scale integration technology. Auto-dial and autoanswer are becoming more standard features. Most modems offer both synchronous and asynchronous transmission capabilities.

And in addition to error-checking protocols and automatic equalization, some modems boast more sophisticated network and line management features. The newer Hayes command set, for example, allows the “smarter” Smartmodem to monitor the line for a dial

tone or for a busy signal and to report back with English language messages.

As a marketing stratagem, some vendors bundle communications software along with their modems. U.S. Robotics, Inc., for example, provides its own Telpac program.

Ease of configuration plays its marketing role, too. Novation, Inc. offers Feature Modules — plug-in, external modules that provide the No-

vation 2,400 Professional modem with security features and enhanced protocols.

While 2,400 bit/sec. modems using V.22 bis certainly seem destined to become a widely used communications standard, they will in no way displace the still-growing 1,200 bit/sec. modem market. Users with the need to move large files regularly across distances or to access asynchronous hosts in termi-

nal mode should consider enhancing their personal computers with 2,400 bit/sec. modems, but those with other requirements should consider carefully before buying.

Again, 2,400 bit/sec. transmission is not an effective solution for interactive, on-line data retrieval. And although the value-added network services are rapidly adding 2,400 bit/sec. service to their rosters (General

Electric Information Services Co. is the latest, providing the General Electric Network for Information Exchange, or Genie, at 2,400 bit/sec. in 63 cities), not everyone will have access to a 2,400 bit/sec. node without a long-distance call.

No matter how fast your modem operates, you need one that will match you bit for bit on the other end.

Also, buyers might want to

Continued on page 48

Your modem should be this good

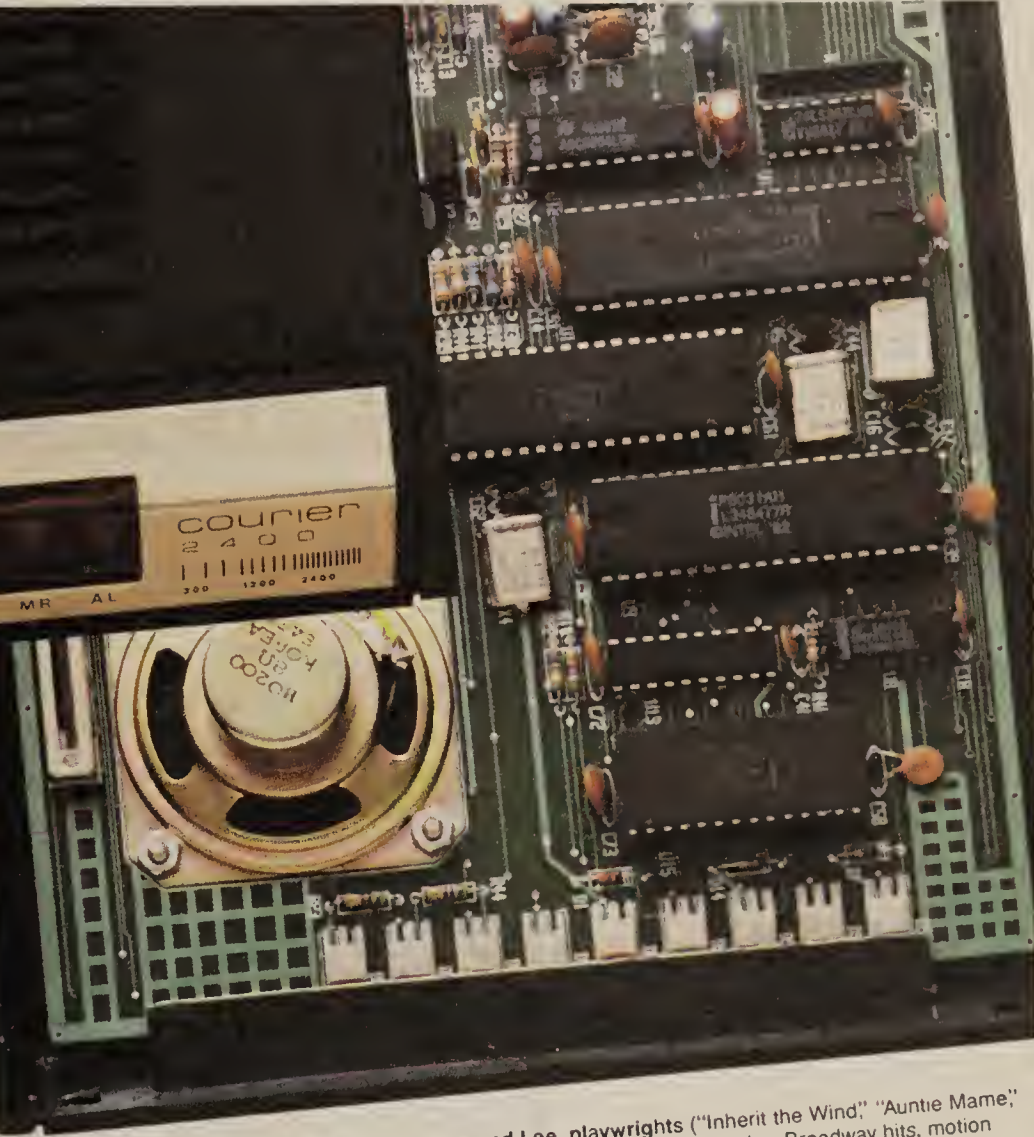
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PERSONAL USE ☐ BUSINESS USE ☐



Users' opinions of high-speed modems: A mixed baud

By JAMES A. MARTIN

Tabulating the results of an informal survey of 2,400 bit/sec. modem users was as easy as flipping a coin — heads they liked them, tails they didn't. Half of the users interviewed claimed that 2,400 bit/sec. modems had seen their heyday and needed replacing; the other half insisted just as loudly that 2,400 bit/sec. modems suited their business needs just fine.

Martin is a Computerworld correspondent.

The 2,400 bit/sec. modem allows users to "do in 15 minutes what they were doing in about 25," claims Tim Longcor, applications programmer for Cone Drive Operations' DP department, a division of Excello Corp. in Traverse City, Mich. "If you can save that much time five times a day, you could save an hour a day of on-line costs."

Cone Drive uses 2,400 bit/sec. technology largely for accessing host information from micros. "We started out with 1,200 bit/sec. modems to access the IBM 4341," Longcor says. "Today, we still have some internal 1,200 bit/sec. modems within micro-computers at a manufacturing facili-

ty to call up the 4341 and download programs to their machine. But for accessing our System/38 through a protocol converter, we've been moving toward the 2,400 bit/sec. modem, mostly for inquiry and updating."

"That speed has made it a lot nicer to work with. You get the screen back a lot quicker, and you definitely realize an increase of speed," Longcor says.

Loyal users agree the bottom line to the 2,400 bit/sec. modem is its savings, pointing out that these units cost little more than the 1,200 bit/sec. modems, yet they offer faster speeds and thus substantial savings in on-line costs.

"Users had been clamoring for better throughput, so the announcement of the 2,400 bit/sec. modem was something people had really looked forward to," recalls Nick Biscotti, systems specialist, telecommunications, at General Electric Co.'s Lighting Business Group in Cleveland.

"Three years ago, we had nothing but 300 and 1,200 bit/sec. modems. Last year was the first time we implemented the 2,400 bit/sec. units. It may not be cost-justifiable for handling one application a month, but for someone who uses it on a regular basis, it certainly means a savings when transferring lengthy files," Biscotti says.

"The 2,400 bit/sec. speed is capable of filling the screen quite adequately for me to do my job. It is a very good speed for the everyday user and saves money and increases end-user productivity," he says.

All users interviewed agree that the 2,400 bit/sec. dial-up modem saves time spent on costly telephone lines and more quickly frees the user to perform other tasks. Users on the flip side of the coin, however, feel the 2,400 bit/sec. modem will be outmoded with the advent of 4.8K bit/sec. modems and 9.6K bit/sec. technology. Consequently, some companies, while generally pleased with the overall performance of 2,400 bit/sec. modems, are preparing to phase them out in favor of higher speed hardware.

Miller Transporters, Inc., a Jackson, Miss.-based bulk commodity carrier, leased 2,400 bit/sec. modems for its 24 remote on-line locations more than five years ago. But by March of this year, these units will be replaced with 4.8K bit/sec. modems.

"We are in the process of developing an on-line billing system, which will have a tremendous impact on our communications. We didn't feel the 2,400 bit/sec. modems would be capable of giving us the response time we needed," Miller Transporters' DP manager Frank Farner says.

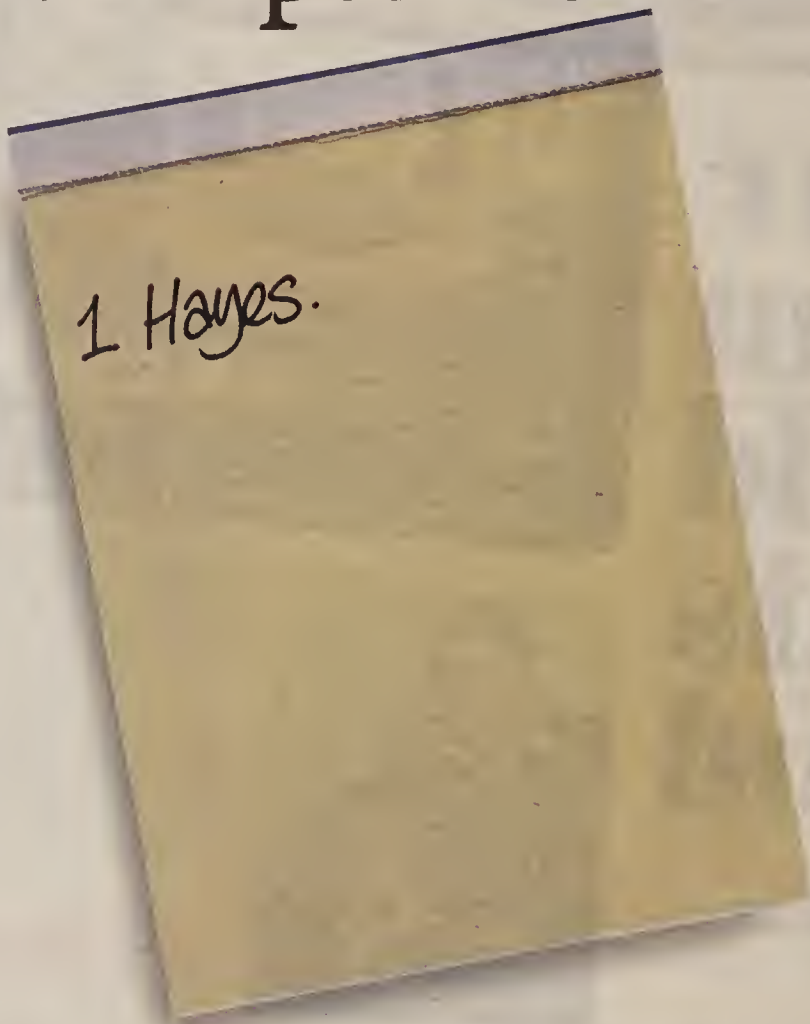
Such sentiments echo the growing prediction that 2,400 bit/sec. modems will soon be overshadowed by the increasing availability of the faster, more powerful 4.8K bit/sec. and 9.6K bit/sec. devices.

To that end, some users have decided to forgo the current crop of 2,400 bit/sec. modems altogether,

See **OPINIONS** page 48

A complete list of things to know about 2400 bps modems.

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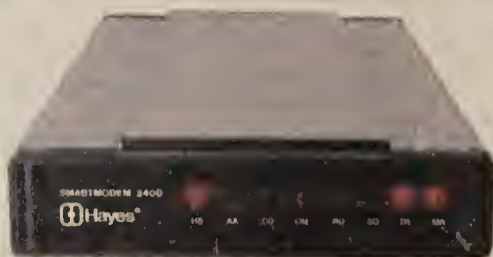
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Product Spotlight/2,400 Bit/Sec. Modems

OPINIONS continued from page 46

preferring to hold onto the 1,200 bit/sec. technology until the 4.8K and 9.6K modems become readily available.

"We are sticking with the 1,200 bit/sec. modem for now," says Phil Larkin, manager of communications at Atlanta-based Days Inns of America, Inc. "We tested some 2,400 bit/sec. modems but felt like they didn't work well in an interactive environment." Days Inns uses approximately 20 1,200 bit/sec. modems for micro-host access through a protocol converter, although no file transferring is being done at this time.

"The 1,200 bit/sec. modems we've had for years get the job done, although it can be frustrating when you're sending a full screen of data out, and you're trying to get it done

quickly," Larkin admits. Days Inns plans to upgrade its operation when 9.6K bit/sec. modems become more widely available.

The majority of the modems used at the North Carolina National Bank, based in Charlotte, are 4.8K bit/sec. units for high-end applications. The company also uses 2,400 bit/sec. speeds for "lower transaction remote

locations," says Richard Simpson, vice-president of telecommunications. "That speed is used where line activity and transactions are anticipated to remain low, so line speed generally doesn't become a factor."

While predicting that the company will eventually use 4.8K modems for all its applications, Simpson said the 2,400 bit/sec. modems will re-

main in use as long as they are operable. "Most companies will use an asset as long as it is usable. That's true with 2,400 bit/sec. modems. Even though newer technology will phase them out in many situations, most corporations will migrate them to an application where they do have some value. A smart company will not throw anything away that is still useful."

For the next few years, the 2,400 bit/sec. modem should remain the de facto standard, according to Biscotti. "The 300 bit/sec. modem is going by the wayside, and the 1,200 bit/sec. may soon follow. And in five years, the 9.6K speed will become the standard. That technology is here now, but it's like color TV was when it first came out — nice, but not fine-tuned enough." ■

— Nick Biscotti
General Electric Co.

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Continued from page 45

consider the newer modems not so much for their additional speed, but for the extra intelligence brought to play, the increased use of error-checking protocols and so forth.

But many of the features that vendors use to add value to their 2,400 bit/sec. offerings are also appearing on their slower modems. Kyocera Corp.'s 1,200 bit/sec. modems, for example, feature the advanced line monitoring functions found on 2,400 bit/sec. competitors. Given the downward price pressure on 1,200 bit/sec. modems, a user without file-transfer-intensive needs might be better off buying a smarter 1,200 bit/sec. modem instead.

Buying into the current crop of 2,400 bit/sec. modems without specific needs but as a kind of general investment in the future is not a good idea. Although vendors agree on at least one standard — V.22 bis — nothing says that this standard is a guaranteed, long-term winner.

Too, vendors are already working on faster, asynchronous modems.

Digital Communications Associates, Inc. and Telebit Corp. announced their 10K bit/sec. screamer at the 1985 National Computer Conference, and Gamma Technology, Inc. offers a very pricey 9.6K bit/sec. half-duplex modem.

Lastly, if you still want to buy a 2,400 bit/sec. modem and can afford to wait — hang on for a while. With market share highly contested in the modem market, pricing is extremely aggressive. Already, the 2,400 bit/sec. modems are approaching the earlier price levels of their 1,200 bit/sec. cousins.

Perhaps one of the greatest general benefits of 2,400 bit/sec. modems is the concomitant downward pressure on 1,200 bit/sec. modem prices.

Price cuts have already started cropping up, and most vendors predict that early 1986 will see further drops of about 10%. ■

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Product Spotlight/2,400 Bit/Sec. Modems

2,400 BIT/SEC. MODEMS

Product/Vendor	Transmission Compatibility				Features											Price ↓
	Bit/Sec.	Asynchronous, Synchronous, Both	AT&T	CCITT*	Duplexing (Half, Full, Both)	Autoanswer	Autodial	Includes Software	Self-Test	Remote Diagnostic Capability	Hayes- Compatible Commands**	Analog Loop-Back	Digital Loop-Back	Help Cues		
Lightning American National Supply Corp. 1243 W. 134 St. Gardena, Calif. 90247	2,400, 1,200, 300	Asynchronous	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	\$599	
24K Plus Ark Electronic Products, Inc. 325 W. Hibiscus Blvd. Melbourne, Fla. 32901	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$795	
Model 4024 AT&T Information Systems One Speedwell Ave. Morristown, N.J. 07960	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$750	
Case 1224 Case Rixon Communications, Inc. 2120 Industrial Pkwy. Silver Spring, Md. 20904	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$649	
Sync Modem Cleo Software Co. 1639 Alpine Road Rockford, Ill. 61107	2,400	Synchronous	Yes	Yes	Half	Yes	Yes	Yes	Yes	No	No	No	No	Yes	\$1,395 (includes software)	
The Cermetek 2,400 Modem Cermetek Microelectronics, Inc. 1308 Borregas Ave. Sunnyvale, Calif. 94088	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	\$645	
Model 2233 Codex Corp. 20 Cabot Blvd. Mansfield, Mass. 02048	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$445	
Comdata Modem Comdata 79 N. Nagle Morton Grove, Ill. 60053	2,400, 1,200, 300	Asynchronous	Yes	No	Full	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$497	
Concord Data 224 Series 2 Concord Data Systems, Inc. 303 Bear Hill Road Waltham, Mass. 02154	2,400, 1,200	Both	No	Yes	Full	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$695	
2424AD CTS Fabri-Tek, Inc. Datacomm Products Division 6900 Shady Oak Road Eden Prairie, Minn. 55344	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	\$395	
DCE 224 Datagram Corp. 11 Main St. East Greenwich, R.I. 02818	2,400, 1,200, 300	Both	Yes	Yes	Full	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$795	
24 K Plus DataLink Ready, Inc. 250 East Drive Melbourne, Fla. 32901	2,400, 1,200, 600	Both	Yes	Yes	Full	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	\$795	
DCA-911 Digital Communications Associates, Inc. 303 Technology Park Norcross, Ga. 30092	2,400, 1,200	Both	Yes	Yes	Full	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	\$795	
Avetex 2400 PC Modem E & E Datacomm Suite 310 1230 Oakmead Pkwy. Sunnyvale, Calif. 94086	2,400, 1,200, 300	Both	Yes	Yes	Full	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$459	
1935D Fujitsu America, Inc. Data Products Division 3055 Orchard Drive San Jose, Calif. 95134	2,400, 1,200	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	\$695	
Access Series 24S Gandalf Technologies, Inc. 1019 S. Noel Ave. Wheeling, Ill. 60090	2,400, 1,200, 300	Both	Yes	No	Full	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	Yes	\$650	

* Consultative Committee on International Telephony and Telegraphy
** Hayes Microcomputer Products, Inc.

The companies included in this chart responded to a recent telephone survey conducted by Computerworld. Further product information is available from the vendors.

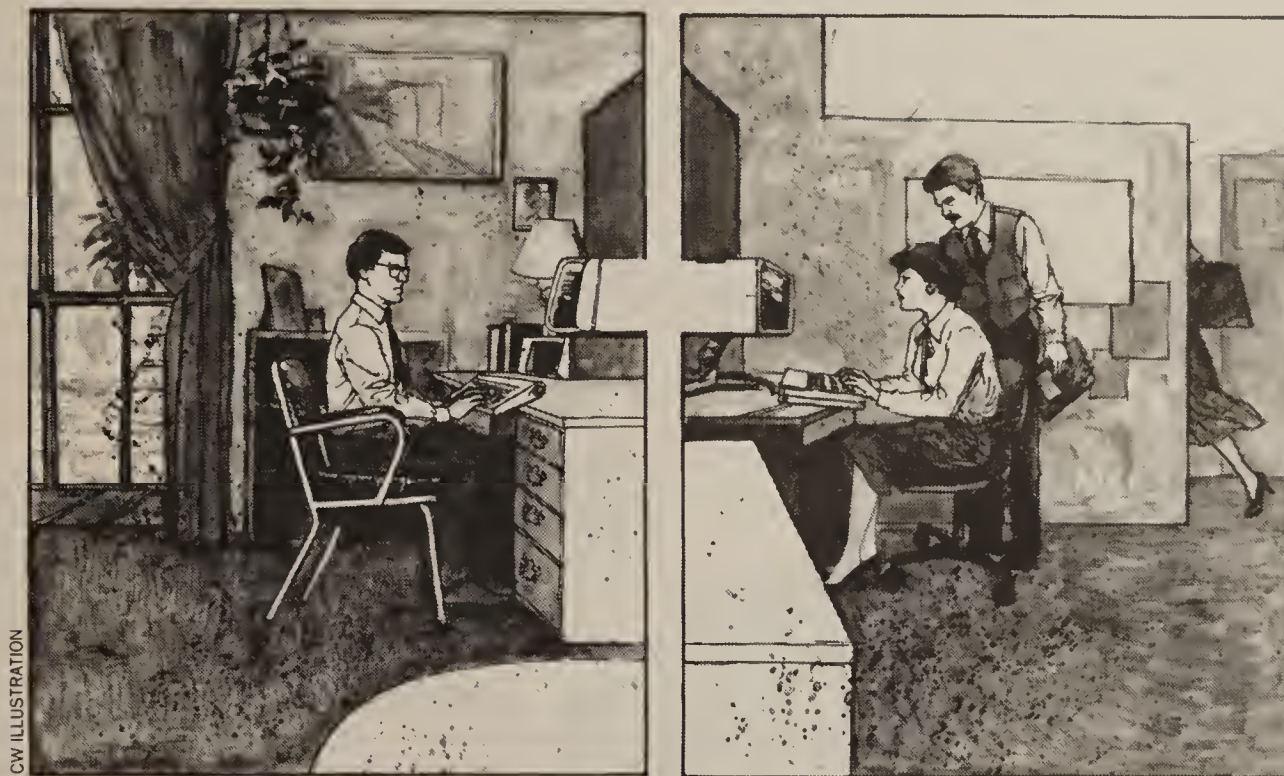
Product Spotlight/2,400 Bit/Sec. Modems

2,400 BIT/SEC. MODEMS

Product/Vendor	Transmission Compatibility				Features											Price
	Bit/Sec.	Asynchronous, Synchronous, Both	AT&T	CCITT	Duplexing (Half, Full, Both)	Autoanswer	Autodial	Includes Software	Self-Test	Remote Diagnostic Capability	Hayes- Compatible Commands	Analog Loop-Back	Digital Loop-Back	Help Cues		
Acculine 2400 General Datacomm Industries, Inc. Rt. 63 Middlebury, Conn. 06762	2,400, 1,200, 300	Both	Yes	Yes	Full	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	Yes	\$795 stand-alone	
Smart Modem 2400 Hayes Microcomputer Products, Inc. 5923 Peachtree Industrial Blvd. Norcross, Ga. 30092	2,400	Both	Yes	Yes	Both	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	No	\$899	
IDEA Comm 2400 IDE Associates, Inc. 35 Dunham Road Billerica, Mass. 01821	2,400, 1,200, 300	Asynchronous	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$795	
M3024+ Micom Systems, Inc. 4100 Los Angeles Ave. Simi Valley, Calif. 93063	2,400, 1,200	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	\$785	
AX/2400 Microcom, Inc. 1400 A Providence Highway Norwood, Mass. 02062	2,400	Both	Yes	Yes	Both	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$749	
MT 224EH Multi-Tech Systems, Inc. 82 Second Ave. S.E. New Brighton, Minn. 55122	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	Yes	\$749 with error correction, \$649 without error correction	
N2420/30 NEC America, Inc. 110 Rio Robles San Jose, Calif. 95134	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	\$695 stand-alone, \$575 rack mount	
The Professional 2400 Novation, Inc. 20409 Prairie St. Chatsworth, Calif. 91311	2,400, 1,200, 300	Both	Yes	Yes	Full	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	Yes	\$895 (includes software)	
FDX 2400 Plus Paradyne Corp. P.O. Box 2826 8550 Ulmerton Road Largo, Fla. 33541	2,400, 1,200, 600	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$795	
Cadette 2400 Penril Datacomm 207 Perry Pkwy. Gaithersburg, Md. 20877	2,400, 1,200, 300	Asynchronous	Yes	Yes	Both	Yes	Yes	Optional	Yes	Yes	Yes	Yes	Yes	No	\$535	
Quadmodem II Quadram Corp. 4355 International Blvd. Norcross, Ga. 30093	2,400, 1,200, 300	Asynchronous	Yes	Yes	Both	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	\$695	
2400PCS Racal-Vadic, Inc. 1525 McCarthy Blvd. Norcross, Ga. 30093	2,400, 1,200, 300	Both	Yes	Yes	Full	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	\$595	
2400I Telenetics Corp. 895 E. Yorba Linda Blvd. Placentia, Calif. 92670	2,400	Asynchronous	Yes	Yes	Full	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	\$645	
224AD Universal Data Systems, Inc. 5000 Bradford Drive Huntsville, Ala. 35805	2,400	Both	No	Yes	Full	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	\$645	
Courier 2400 U.S. Robotics, Inc. 1123 W. Washington Chicago, Ill. 60607	2,400, 1,200, 300	Asynchronous	Yes	Yes	Full	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	\$699	
424PA Western Datacom Co. 5083 Market St. Youngstown, Ohio 44512	2,400, 1,200, 300	Both	Yes	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	\$695	

In Depth

Telecommuting benefits business with DP's help



CW ILLUSTRATION

Once a convenience for corporate DP departments alone, telecommuting is now spreading throughout the organization. From chip designers to customer service representatives, teleworkers report improvements in productivity and quality of life.

Part 1

By THOMAS MILLER

The city government of Fort Collins, Colo., is probably not the first place that comes to mind when you think of computers and revolutionary new ways of working. But out of the city's total staff of 800, 44% of whom are office workers, some 25 employees now work full-time from home — electronically. As many as 100 others telecommute part-time, including, remarkably, all seven elected City Council members, who carry portable computers to stay in touch with city affairs via electronic mail.

What makes telecommuting in Fort Collins so advanced is not the size of the program. It is that so many non-computer professionals and staff are able to telecommute routinely, on an as-needed basis, and thus improve communications, performance and quality of life. Their work is supported by digitized communications and a technology infrastructure designed by systems management for the benefit of the entire organization. Of course, the city's Information and Communications Systems (ICS) department staff telecommutes to meet its own needs as well.

"Telecommuting is an important

Miller is director of research for New York-based Electronic Services Unlimited (ESU). ESU provides consulting, training and research services in the telework field and publishes "Telecommuting Report," a monthly newsletter.

benefit of our office automation system here," says Peter K. Dallow, who directs the city's ICS department, "but it's not our central purpose. Our central purpose is to support and give focus to things that are important to the success of the organization. We have learned that almost everyone can benefit from part-time telecommuting, and a surprising number can use it full-time."

Telecommuting has progressed further in Fort Collins city government than in most municipalities, not to mention most companies. But at a growing number of Fortune 1,000 firms and other large companies, DP managers and their counterparts in MIS and telecommunications are witnessing the evolution of new remote applications that may be generally categorized as "telework" — the art and science of moving information rather than people to get the job done.

Making something out of telework

Technical resources managers accustomed to more traditional ways of working sometimes do not know whether to yawn or sit up straight when a user begins asking questions about telecommuting. What to make of it? The answer depends very much upon what you want to make of it, but a growing number of serious people are making a lot, with less stress and more satisfaction, by telecommuting on terms mutually beneficial for themselves and their employers.

Putting an exact date on when telecommuting began is hard, but the time period is the late 1960s. The place is one of numerous DP departments in

In Depth/Telecommuting

more companies than one could ever count, from which someone got a telephone call at 2 a.m. to come down to headquarters and troubleshoot the mainframe. These late-night calls still remain a common corporate starting point for discovering the advantages of being able to work from home electronically.

At IDS Financial Services Co. headquarters in downtown Minneapolis, those late-night debugging sessions can occur in 20-degree-below-zero weather. "Our systems programmers are on call 24 hours a day," explains Glen Hansen, director of data processing operations. Until about three years ago, if the system went down, the systems programmers had to make the dreaded 2 a.m. drive. "Now telecommuting solves the DP problem of the need to have a sophisticated technical person on-

site at night."

Hansen points out that "the financial services industry is . . . an information business, and the best way to manage information is with technology." His team of 12 to 15 systems programmers use old Texas Instruments, Inc. terminals or IBM Personal Computer 3270s at home to troubleshoot remotely after hours and occasionally to achieve better concentration on design projects. Six IDS end users in Minneapolis also do some of their work at home now.

Throughout the U.S., IDS has 185 modems in use for micro communications — some running at 2,400 bit/sec. — mostly for interoffice-type telework.

The IDS program is typical of many department programs that begin to grow a little bit here and a little bit there. From troubleshoot-

ing, programmers move on to late-night design test runs from home. From design runs, they move to catch up on backlog from home. From backlogs, they move to telecommuting to improve the quality of their lives. As word spreads, individuals outside of the DP department sometimes decide they, too, would like to try telecommuting.

The manufacturing telecommute

At Digital Equipment Corp.'s South Burlington, Vt., manufacturing plant, 175 employees either have permanent terminals at home or have access to transportable setups provided by the DP department for work at home.

True to form, DEC's program began several years ago with DP department troubleshooting. Today, a subgroup of the department, called

the Computer and Telecommunications Technology subsidiary, has five software engineers and systems programmers on 24-hour call. Each has a separate voice-grade telephone line at home hooked directly to a DEC DF224 2,400 bit/sec. modem and a VT200 terminal.

At DEC, telecommuting's potential was soon recognized by various engineers and managers who saw opportunities for fewer distractions in design work and the chance to catch up on electronic mail, memos and report preparation.

In addition, customer service representatives were able to speed up customer problem solving without having to travel to the office. About two years ago, the original dial-up rotary hunt modems in the plant were expanded from seven to 12 to support the 175 telecommuters, many of them non-computer professionals.

"The work done at home," says Doug Murphy, who manages the Computer and Telecommunications Technology subsidiary, "far outweighs the cost of a phone line and buying extra equipment." For the \$16 monthly cost of the line, Murphy gains benefits such as the freedom for his staff to develop ideas at any time they feel like it. "Frankly, I get a lot more work out of them at home," he says. Now, design engineers may even borrow a powerful DEC Microvax II.

At IBM's Essex Junction, Vt., semiconductor plant, not far from the DEC manufacturing facility, 120 IBM systems programmers and chip designers also have terminals at home for after-hours work. Described as the "Terminal At Home" program, the number of participants is expanding, according to Robert Neudecker, a spokesman at the plant. The program fosters individual productivity by allowing employees to tap on-site, 24-hour host computers late at night for problem solving and design changes.

Throughout IBM as a whole, more than 8,000 terminals and personal computers reportedly are available via the Terminal At Home program. However, these are used strictly to boost after-hours productivity, not as a substitute for daytime hours in the office, the company says.

Networks and 800 numbers

As DEC's South Burlington plant illustrated, the wider benefits of telecommuting also flourished first within the computer profession. One company that was among the first to consider telecommuting as an organizational style is Tymnet/McDonnell Douglas Network Systems Co., known as Tymshare, Inc. until its acquisition by McDonnell Douglas Corp. Tymnet's value-added network and Ontyme electronic mail services grew out of an innovative shared DP company started in California in 1967.

"Without realizing it, employees of both the original Tymshare and Tymnet companies were telecommuting before the idea was even invented," says Jack Daley, manager of interconnect and access technologies. Today, as many as 15% to 20% of Tymnet's current 1,800 employees telecommute. The larger McDonnell Douglas Information Systems Group also has many telecommuters.

Clearly, the legacy of what some see as a quintessential California work style is still very much alive,



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In Depth/Telecommuting

Telecommuting cost/benefits analysis

Telecommuting costs are most commonly treated as departmental expenses related to office automation rather than as a separate budget. Most programs do not quantify the benefits unless straightforward measures, such as lines of code, can be used to evaluate productivity. The chart comes from a company at which a team of 20 programmers telecommutes from home.

The hardware used includes IBM 256K-byte Personal Computers; monitors; a parallel printer adapter; Okidata Corp. Model 92 160 char./sec. printers; cables; Hayes Microcomputer Products, Inc. Smartmodem 1,200 bit/sec. internal boards; electrical surge protectors; and five IBM color graphics boards for managers.

Software used includes Coefficient Systems Corp.'s VTerm Version II, Microsoft Corp.'s MS-DOS, Multimate International Corp.'s Multimate word processor, Lotus Development Corp.'s 1-2-3, a Realia, Inc. Cobol compiler, Command Technology Corp.'s SPF/PC and floppy disks.

The data center costs include two Micom Systems, Inc. 7400 protocol converters; 12 nonsecurity modems; one 12-port Leemah Datacom Security Systems secure access unit (not charged to program for one year); 12 installed telephone lines; two host-to-Micom connections; and labor. The Leemah unit

	One-Time Charges	Monthly Expenses
Hardware	\$ 66,000	\$ 500
Software	24,000	—
Data Center Hardware	26,700	—
Telephone Installation/Service	3,200	300
Furniture for Home Workers	4,000	—
Administrative Overhead	—	3,000
Total for 20 Telecommuters	\$123,900	\$3,800
Cost Per Telecommuter	\$ 6,195	\$ 190

allows for autodial back over random modems, rather than dedicated modems, with queuing.

The figures above do not include telecommunications costs, which vary according to several factors: type of work application, dial-up vs. dedicated lines, distance from office and length of typical work session. Figures have been reported as low as \$15 to \$20 a month and as high as several hundred dollars or more a month.

Use of personal computers and dial-up voice-grade lines — sometimes conditioned for data to bring down the cost of on-line time — represent the current trend.

So go the costs. Translating the benefits of telecommuting into dollar values is harder. Possible line items, depending on the type of telecommuting work, might include the following:

■ Increased employee productivity, which could be 10% to 20%,

according to conservative increases reported in Delphi-based studies.

■ Recruiting and training of a skilled programmer, which amounts to \$110,000, according to Pacific Bell Telephone Co.

■ Reduction in casual absenteeism, a savings of 2% of the worker's salary.

■ Office space savings, which amounts to 30% to 50% of space, including rate per foot plus related administrative costs.

■ Cost of employee relocation, which is \$35,255 for home owners and \$9,220 for renters, according to Chicago corporate relocation specialist Runzheimer & Co.'s figures for 1985.

■ Other possible cost savings, the amount of which is job-specific.

■ High-performance output results such as faster customer processing, fewer errors and so on. The dollar value again is job-specific.

— Thomas Miller

monthly, or more often if work justifies the trip.

Low overhead, high creativity

Gale Carr, president of Rising Star Industries, says all this activity is cost-effective. "I end up basically dealing with approximately \$10,000 total expenses per month for 40 programmers, including office supplies, telephone costs, travel mileage. I have no rent, utilities and so forth."

The infrequent cross-country treks by head designers run perhaps another \$5,000. Otherwise, the very computers for which the company develops software, plus 1,200 and 2,400 bit/sec. Hayes Microcomputer Products, Inc. Smartmodems, make up the primary capital investment of the company.

Personal creativity is perhaps the major benefit cultivated by Rising Star's way of working. The company does not look for people whose "main goal is to get from nine to five doing as little as possible." Despite generous salaries and an employee stock option plan, money is not the most important thing either, says Roger Amidon, an East Coast project leader for the company. "The reward from accomplishing and creating is such a kick for me," he says.

Amidon discovered telecommuting on his own even before starting work with Rising Star. At his previous job, Amidon's daily commute took a total of four hours, which finally began to get to him.

"It was crazy for me to sit in my car four hours to sit at a terminal eight hours," he says. "I was, in effect, working 12 hours and only getting paid for eight."

So he talked with his employer

and got approval to telecommute, going into the office once a week to maintain a physical presence. To his surprise, his productivity improved significantly. He found that "when things were on a roll, I didn't have to stop because the office was closing and the janitor wanted to clean the floor."

Now Amidon works an average of

10 to 12 hours a day, as do most of the company's programmers, but he recalls periods when he worked 16- to 19-hour days for months in his upstairs computer room. In fact, many telecommuters comment on the workaholic tendencies of working at home, in part because of the lack of the usual cues for stopping.

"When my son says, 'Daddy, I

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with encouragement from the company. Daley agrees that the Silicon Valley atmosphere is conducive to building new traditions such as location-independent work.

"Telecommuting, like the telephone, is a tool used to complete the job. Location is not the prime criteria in accomplishing work," he explains.

Tymnet's programmers, field service technicians, engineers, contract staff and sales representatives all actively telecommute. Depending upon the jobs involved, local managers decide whether the company will supply the equipment or reimburse employees for buying their own.

A real key to Tymnet's wide-scale and successful implementation of telecommuting is, of course, its network facilities. Tymnet technology makes it easy for employees to dial a local number from almost anywhere and connect with almost any resource they need or with a company store-and-forward voice mail 800 number. The resulting benefits Daley cites include savings on office space and time, projects accomplished in a timely manner and substantial overall productivity improvements.

Daley calls telecommuting "a convenience to the employee and the company. It allows the employee to work at his own pace and at locations relevant to getting the work done.

"The integrity of the individual is a paramount aspect of being a telecommuter. Managers who have good relationships with employees do not need to look over the shoulders of their staff," he adds. At Tymnet, the telecommuter of today, as Daley puts it, "may be an office worker tomorrow, and vice versa."

Another company of computer professionals that has built a whole culture based on telework is Rising Star Industries. From 1982 to mid-1985, Rising Star had 30 to 40 applications programmers — all telecommuters — working exclusively on the company's contract with Epson America, Inc. to develop Valdocs software for Epson's QX10 and QX16 personal computers. Now their entrepreneurial star is hitched to software development for the Atari, Inc. 520ST. The company currently comprises 80 employees in telework groups clustered around Princeton, N.J., Philadelphia and New York and in Southern California.

A variety of electronic tools is used to keep everyone in Rising Star in touch with a minimum of conventional office resources. Daily telephone calls between programmers, combined with E-mail and various specialized computer bulletin boards, contribute to make remote locations seem more like an office across the hall.

To combat cabin fever and any tendency toward alienation, programmers regularly get together in person at a local restaurant and at the home of a project leader. The informal style is born of the creative culture of local computer club meetings, which is where some employees were recruited.

Project control is achieved via the daily networking routine and monitored by head designers who make one or two annual trips across the country to visit team members in person. These visits focus on in-depth analysis, debugging, hardware problems and project direction. Also, local project leaders may travel to the Torrance, Calif., headquarters

In Depth/Telecommuting

haven't played with you in a long time,' I know it's time to take a break," Amidon says now. "My family is No. 1. My job is a close second — but it is second."

Among the personal benefits he appreciates are the ability to stop for a break whenever he needs it, to take his wife and children out and to take care of necessary appointments, such as the dentist, at any time during the day. Also, he can avoid busy shopping weekends. In this respect, telecommuting can be likened to an ultimate form of flextime.

'The edifice complex'

Many managers have a hard time overcoming the idea that the central physical office is indispensable or that employees cannot be managed out of sight. Virginia Ostendorf, a consultant in the teleconferencing field, has called this the "edifice complex."

Nearly all of us have some of its symptoms. Perhaps DP professionals, accustomed to ephemeral concepts such as virtual memory and virtual networks, are less subject to it than others.

Thus, Glen Hansen at IDS Financial Services questions how far the telecommuting trend can go, despite the fact that his own department telecommutes with success. "Most jobs require fairly close contact," he believes. "Person-to-person communication provides for the optimum in productivity." The lack of interaction implicit in larger scale at-home telecommuting is a possible threat to coordination and cross-training, in Hansen's view.

This perspective is enlarged at IBM into official company policy. Daytime substitution of work-at-home for time in the office is thought to jeopardize the company's "desire to maintain the healthiest possible employee-manager relationships . . . along with recognition of the positive effect of peer interaction on productivity."

Yet IBM does not question the positive effects on productivity gained by making thousands of terminals available in the Terminal At Home program. Is IBM's policy the natural reflex of a healthy organizational instinct or a veiled symptom of the edifice complex?

In fact, thinking about telework as if it's all good or all bad is not very realistic. After all, managers in conventional office settings pay some heavy penalties when all work is restricted to one location.

The "productive" setting of an office may be rife with ineffective office politics, distractions, outmoded procedures, lines at the copier or computer printer, queues on the communicating terminal and a whole host of

games people play to look busy when they are not.

The edifice complex also leads to inevitable forms of absenteeism, a variety of stresses directly traceable to working in office cubicles and absurd social consequences such as commuter traffic congestion.

No miracles

Peter Drucker, considered by many to be the father of modern management theory, has pointed out that organi-

zation design is a series of risk-taking decisions rather than a search for the one best way.

His advice is especially appropriate to telework structures. Because telework is new, the tendency is to imagine it can solve all your old problems. The truth is seldom so dramatic.

Instead, managers interested in optimizing their options can look at a growing spectrum of telework strategies. For minimal incremen-

tal time and money, they can try applications suited to levels of trust and risk that fit their work groups.

Telework does not call for more trust; it calls for careful assessment and reapplication of the trust that is necessary for organizational performance in the first place.

Win-win strategies

"Telecommuting can be a classic win-win work strategy with clear benefits to

both employers and employees," says Marcia M. Kelly, president of Electronic Services Unlimited and coauthor of *Telecommuting: How to Make It Work for You and Your Company* (Prentice-Hall, Inc., New York, March 1986). "It is a work style suited very much to today's emphasis on generating productivity through programs tailored to the human resource needs of an organization," she notes.

Electronic Services'

HOW TO MAKE A GREAT IMPRESSION AT THE OFFICE

In Depth/Telecommuting

”

Telework does not call for more trust; it calls for careful assessment and reapplication of the trust that is necessary for organizational performance in the first place.

studies have found that a set of ground rules are followed in most successful work-at-home applications. Among the basic rules — spoken or unspoken depending upon the organizational culture — are the following:

- The importance of clearly defining the purpose for which telecommuting is being used.

- Careful selection of managers and employees using a qualified volunteer system.

- Good technical support, with adequate but not unusual security.

- Emphasis on results-oriented management.

- Communication habits that rely on self-initiative.

- Ideally, work group familiarity with electronic networking.

Obviously, not all organizations have a cultural predisposition toward telework in the same way that Tymnet or Rising Star do. In some instances, skill-based training

can supply a needed boost. Also, the push to implement personal computers has affected an astonishing variety of companies. Many are beginning to discover that benefits for location-independent work go well beyond the technically oriented DP environment.

Experience now shows that it is hard to predict exactly who will recognize the new opportunities and who will not. Even within a single company, not everyone sees or agrees about the opportunities to make telework pay.

The 'ostrich method'

In this regard, ICS department director Dallow learned several things from his implementation experience in Fort Collins. For one, Dallow says, "The 'ostrich method' was very useful. Like an ostrich with its head in the sand, we basically ignored managers who at first resisted the idea of telecommuting and supported those who were interested in trying it."

Another approach he learned was to downplay the word "telecommuting," if need be. "Use a word like 'flextime,'" he says. "Then you don't have to try so hard to explain the concept and risk arousing distrust."

It's a lot easier to get someone to understand his location-independent work options after he's had hands-on experience, he says. "We provided the technology in the office first, then moved it out to the home."

"But it's clear that not everyone likes computers," counters Dennis Conley, information center consultant to Borg-Warner Chemicals in Parkersburg, W. Va. Between 45 and 50 field service engineers at the firm are using personal computers for informal daily communications with headquarters from home, according to Conley. They use services like The Source from Source Telecomputing Corp., CompuServe from CompuServe, Inc. and direct links to the company's DEC VAX.

Although Conley says he believes most people in the company are happy with computers, he has seen some resistance, especially among the sales force, who "feel nervous about anything they think will not permit them to 'press the flesh.'" Computers can make a competent employee feel alienated, and "you could actually lose key personnel," he says.

In Conley's opinion, the question of computer literacy will eventually come down to quality of life — an important goal at the company. Echoing Anidon at Rising Star, Conley says, "many will love having computers at home so they can spend more time with family." ■

(Part 2: Telework offers companies a competitive edge.)

With the Hewlett-Packard LaserJet Printer.

Page 2
1985-86 Marketing Report

indicating a lower overall risk than had originally been projected.

Market Penetration

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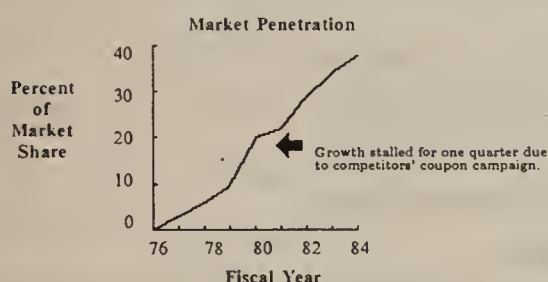


Figure 2a. Market Penetration (all geographic areas)

All regions are contributing to this growth, especially the Southern Region, which is experiencing a growth in market penetration far greater than the industry average. In the last three quarters, the Southern Region has increased at a rate twice that of the same period in the previous year. Figure 2b compares Southern Region and overall company performance with industry growth rates.

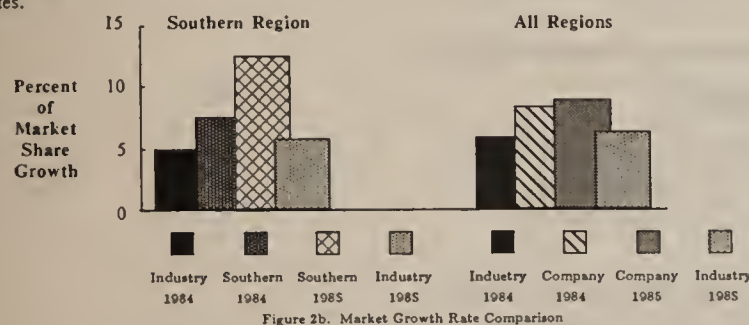


Figure 2b. Market Growth Rate Comparison

This would indicate that the increased effort directed at the dealers in the South has proved successful. No other elements were altered.

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In Depth

The secrets of consulting

Gerald Weinberg's guide to how jigglers trigger change

By GERALD M. WEINBERG

In one of my workshops, Karma told me about the day she was sitting in her cubicle reading a book called *The Supervisor's Survival Kit*. One of her supervisor's colleagues happened to come by and, when he noticed the title, said, "You shouldn't be reading that!"

"Why not?" she asked.

"Because you're not a supervisor."

Karma, who is never at a loss for the appropriate reply, smiled and said innocently, "Oh, do you want me to wait until it's too late, like they did with you?"

Although this article is ostensibly for consultants, I do hope that other people don't put off reading it until it's too late. I hope that you read this article even if consulting is merely a slight possibility some time in your distant future. Even if it's no possibility at all, that is, if you're not a consultant yourself, you're likely to find yourself working with consultants, and that is a very good reason for reading ahead.

Come to think of it, a supervisor's survival kit should be even more useful to a supervisee. Any good supervisor should be thrilled to see a worker learning about the problems of supervision. Supervisors aren't appreciated because most workers don't have a clue as to what supervisors really do. They see the rewards — the paycheck, the nice office, the power — but if the supervisor is doing a good job, most of the work itself is essentially invisible.

The same is true of consultants. Many of my clients are impressed with my trips to exotic places, nights in posh hotels, meals in fancy restaurants and fees that seem to dwarf their paychecks. They don't see the confusion of jet lag, the insomnia from strange beds, the indigestion from overeating or the overhead and unpaid days that must be subtracted from my fees.

Most of all, even when they work with me, they don't really see what it is I do.

In the same workshop that Karma told her story, Larry told a story that

explains why my clients don't see what I'm doing:

Zeke and Luke were hunting bear. While they were taking a beer break, a bear came crashing out of the underbrush, heading straight for them. Zeke and Luke started running away, but the bear was rapidly closing the gap. "I don't think we can outrun the bear," Zeke panted.

"That's all right," Luke shouted over his shoulder as he pulled in front of Zeke. "I don't have to outrun the bear."

"Why not?"

"I just have to outrun *you*."

Like Luke, I just have to outrun my clients. Of course, it's not always easy to do that. They work at their jobs eight hours a day, every day, and I come in only a few days a year. When it concerns their day-to-day activities, there's no way I can even keep up with them. My success as a consultant depends, like Luke's, on being in the right situation, one in which the slightest lead is as good as a million miles.

To be successful, I must amplify my impact. I must work like a martial arts master, applying the slightest force and allowing the weight of my opponent to do the work. If I'm successful, my clients will experience change, but they probably won't notice that I've done anything at all.

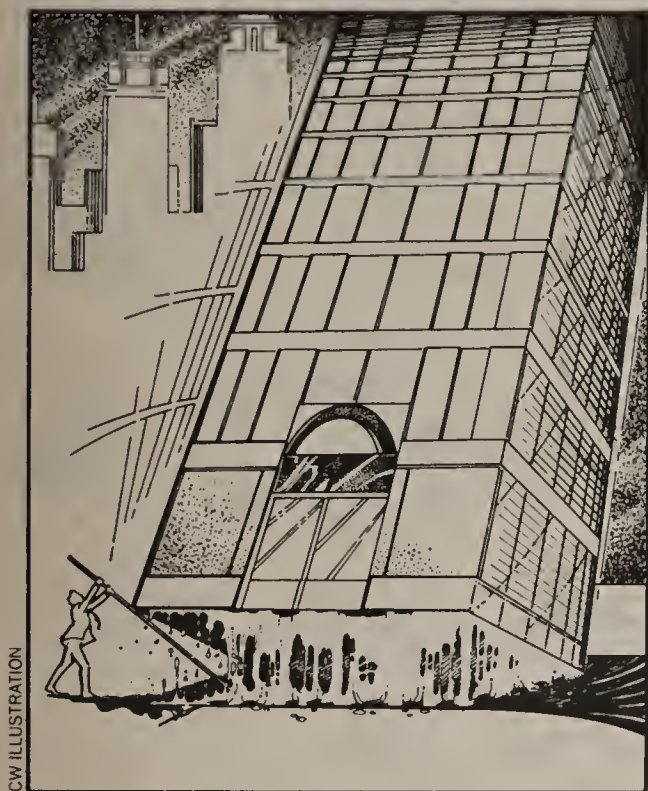
Jiggling stuck systems

The image of a consultant is quite passive. Consultants gather information and present it to an organization, which may or may not be affected. Although the process seems innocent enough, there's really no way to retain a consultant without causing some change to occur. This may sound threatening, but in many cases, a little disturbance may be good for an organization.

As electronic systems grow more complex, they begin to act more and more like living systems. Many wild animals cannot breed or even be kept alive under laboratory conditions, and the first radar systems were a bit like these wild animals: They would work under combat conditions but not in the sterile laboratory environment.

Before World War II, no artificial system was sufficiently complex to display the reason — the radar equipment's dependence on a noisy environment.

But we now understand that any large, complex system operating in an



Any large, complex system operating in a controlled and predictable environment can get stuck. Some kind of jolt or jiggle from the outside — possibly in the form of a consultant — may help.

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Plus Honeywell offers distributed data access and distributed processing in networked systems that include IBM mainframes.

All this in a system tailored to your needs, and able to expand along a clear growth path via our fully compatible DPS 6 family of micros, minis, and supermini computers. And, of course, our traditional strength in mainframes.

Every system is also backed by Honeywell's worldwide TotalCare™ customer service program that helps your system perform to your requirements. Particularly during crunch time.

Find out how Honeywell's TP Business Action Partner can cut your toughest order processing and billing challenges down to size. Call 1-800-328-5111, ext. 2799, or write Honeywell Information Systems, 200 Smith Street, MS440, Waltham, MA 02154 for our brochure. It will tell how you can handle more action than ever.

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Honeywell

At 19,200 bps, speed alone can be blinding.

In the race to claim the fastest high speed modem, many modem companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that modem purchasers are getting so caught up in modem speed they're losing sight of the most important consideration.

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The answers to these two questions will lead you to one modem.

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It's the thoroughbred of 19.2 kbps modems. The superior performance of the Codex 2680 is achieved by utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), enabling Codex to position error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

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It's all perfectly clear.

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext.227**. Or write Codex Corporation, Dept. 707-227, 20 Cabot Blvd., Mansfield, MA 02048.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem. Performance.



*The new Codex 2680 19,200 bps
high speed modem.*

*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

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codex
 **MOTOROLA**

This sticking effect is another reason successful organizations fail. As organizations become better managed, their day-to-day operations can become so smooth that parts of the organization get stuck and cease productive functioning. This problem is particularly acute in those parts of the organization that are supposed to do new, creative work: research, development, training and programming.

When a function begins to stick, some kind of jolt or jiggle from the outside may help. For radar, the problem was solved by attaching random motion generators to the racks to break up the stable states in which the equipment tended to stick. These generators were called jigglers.

In organizations, a disaster such as a fire often has an invigorating effect. Strikes, when managers have to step into operational roles, sometimes give a similar shot in the arm. But it's not necessary for an organization to suffer the risk of arson or labor agitation in order to get unstuck.

Instead, any outside, unpredictable but nonthreatening agent can give the organization a jiggle.

The juggler role

Some outside agents enter organizations as part of the natural order of business. New workers can serve this role. So can new managers. Sometimes, a consultant working on one problem can accidentally touch another area in which the organization is unknowingly stuck.

In recent years, the computer and the computer sales force have assumed the role of organization jiggler. When I worked for IBM, I myself often played this role, getting customers unstuck from problems that had nothing whatsoever to do with computers. At that time, however, I didn't realize that the jiggler was separate from the role of computer salesman or technician.

Later, during speaking engagements, I found that I spent one hour giving a speech and seven hours listening to people tell me their problems. I am not by nature a passive listener, so I often made jokes, uttered cries of disbelief, asked dumb questions and sputtered grunts of noncomprehension. To my surprise, many people told me that my speech had solved their problem. I came to realize that it usually wasn't the speech, but these unstructured sessions before and after the formal part of the program, that solved the problems.

Over the years, I've discovered that what I do has no commonly accepted name. The best name would be juggler, but who in his right mind would pay for the services of a juggler? It sounds too much like juggler, or giggler or even gigolo. So, after trying various alternatives, I still use the public name "consultant," although secretly I know I'm a juggler. (My Tarot card is the Fool.)

As a juggler, my job is to get something started, to cause some changes that will ultimately get the system unstuck. As a systems juggler, I confine myself to working with organizations at various levels. Although I naturally work with both workers and management in my efforts to get things off dead center, I'm neither a psychiatrist nor a personal confi-

dant, but these can be jiggler roles as well.

Stuck by overload

Perhaps the best way to understand what a juggler does is to consider a few examples. A systems programmer complained that he was bothered by applications programmers all the time and could not do his assigned systems work. I sat alongside the systems programmer for a few hours, observing all his work habits and interactions with applica-

tions programmers.

I discovered that every problem involved reading dumps, the detailed printouts of the machine's full memory contents.

The applications programmers didn't know how to read dumps effectively, so they turned to the systems programmer each time they had a problem.

I jiggled them at one level by observing that there are tools that format dumps so they can be read by the applications programmers. The

systems programmer was delighted with this solution, but I knew that this problem might be merely a symptom of a larger form of organizational "stuckness." Therefore, I jiggled management with the following questions:

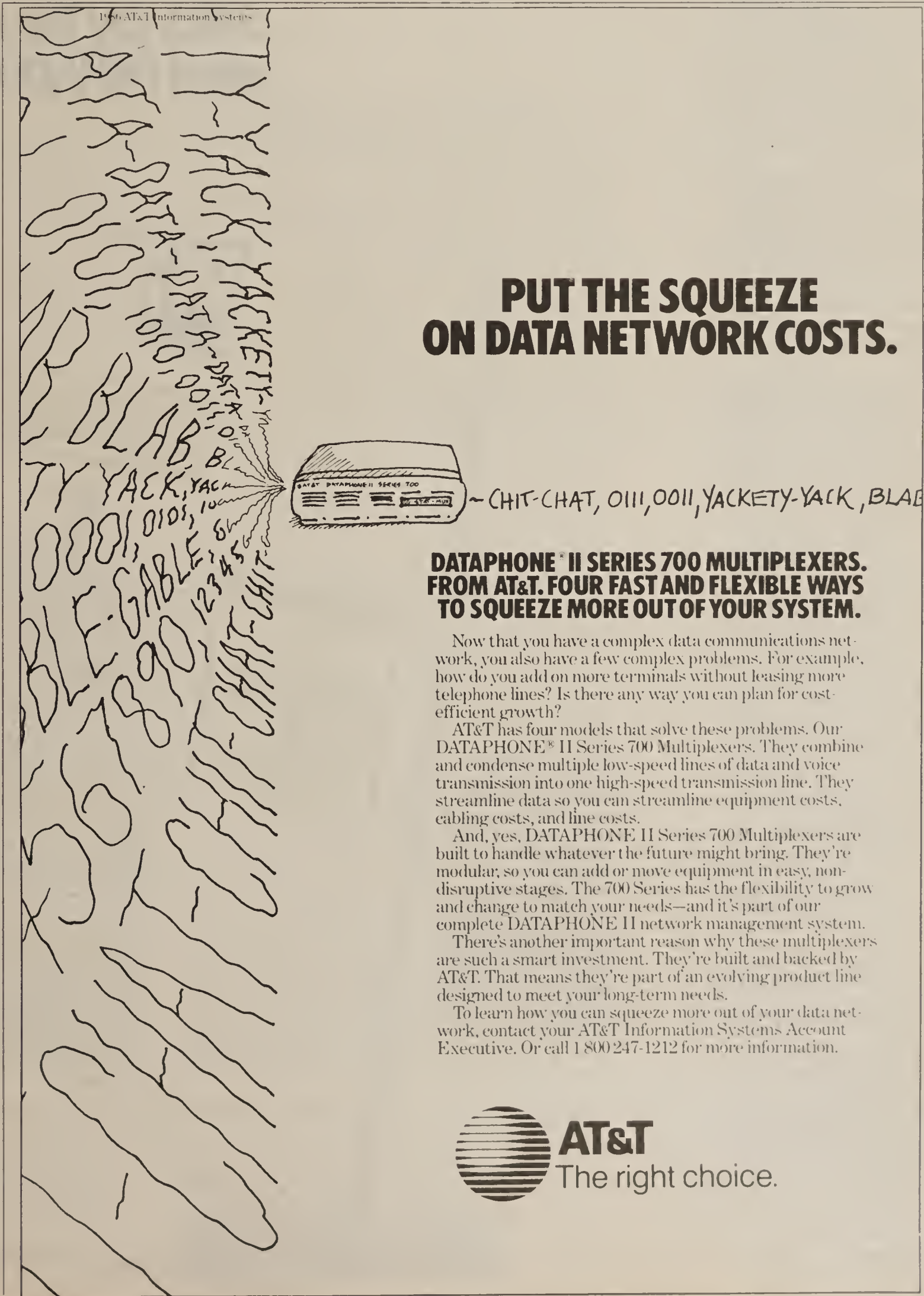
■ Is it possible that nobody in the entire, rather large, organization knows of the existence of common tools like dump formatters?

■ Isn't it surprising that so many applications programs are getting dumps in the first place?

■ Is the training program so out of touch with the actual work done that programmers aren't taught to interpret dumps?

Working with questions such as these, I got the client to reexamine the entire department as a problem-solving organization.

But even that wasn't enough. For



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the professional juggler, there is always one more question:

■ Could the organization itself have generated the other questions? In other words, could it have juggled itself?

With this question, I started the organization on the road to problem prevention, one level higher than problem solving.

Stuck communication

Here's another example. A project manager told me that she was worried about her team leaders. They didn't appear to appreciate that the project was in serious trouble. However, I could see signs of their fear when the subject of project schedule was broached. I asked the project manager to leave me alone with the five team leaders for half an hour and then proposed that each leader write an anonymous schedule estimate on a slip of paper. The anonymity dealt with the fear.

The estimates gauged the probability that the project would be done on schedule. I gathered the papers and found that the highest of the five estimates was 20%! All five knew that the project was in serious trouble, but all were afraid to say anything in front of their manager.

Using a similar technique, I mapped out the probabilities of completion at various dates in the future. When the project manager returned, she gave her own estimates: Her figures showed the same probabilities.

When the team leaders saw that their manager was equally pessimistic, communication began, and the team leaders admitted that they were afraid to speak their minds because they didn't know that the others felt the same way. Ultimately, project completion was rescheduled to a more realistic date, and steps were taken to assure that the new date would be met. Other measures were taken to ensure that future communication on the subject would remain open.

I was able to jiggle this stuck communication system for several reasons:

■ I was a neutral person who would not betray any one individual.

■ I knew a technique whereby people could reliably but anonymously reveal their true feelings about the schedule.

■ I possessed general skills in facilitating accurate communication.

■ I understood how communication patterns work and how they could be established to avoid blockage in the future.

Keeping opportunities open

I'm seldom retained as a juggler. Sometimes I'm engaged as a speaker, some-

times to perform a checkup and other times as a consultant on a technical problem. But there are always opportunities to jiggle.

For one thing, people don't always see what their real problems are, so consultants are often employed to make the system get even more firmly stuck on the wrong problem. With software organizations, for example, I'm often retained to improve quality by teaching the staff how to remove er-

rors, rather than how to prevent them in the first place.

For another thing, when you have your eyes and ears open, you can't guarantee you'll observe only things that are relevant to the official problem. Nor can you guarantee that you'll only affect things that are considered relevant. I try to make my clients understand that their system is likely to be juggled by my presence. If they find that prospect too frightening, then my consult-

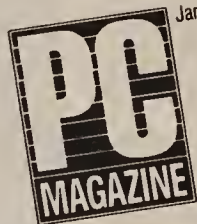
ing probably won't be effective, and so I usually turn down the job.

Giving a speech is a form of jiggling. An inspiring speech can do wonders for a stuck organization, but jiggling will fail if the arrangements are too formal. Most speeches are arranged under circumstances that will be "safe" to the organization — and that is as it should be. It's the function of management to keep things running smoothly; it's only when

management is *too* successful that things running smoothly in the groove become stuck in a rut. Therefore, I try to arrange opportunities for jiggling to take place outside the speech itself.

Rather than being introduced as a speaker and consultant, I prefer to be introduced simply as "someone from outside with whom anyone can discuss matters of concern." When this concept is too difficult for

Some of the industry's toughest critics say the nicest things about PARADOX



January 14, 1986

Ansa Software's Paradox commands attention as a high-end database manager. Not only is it fast and easy to use, but it combines the best features of 1-2-3, dBASE, and Infoscope with its own to make one impressive program.

PARADOX A DATABASE MANAGER WITH A FAMILIAR FACE

This review is unedited. The text has been reprinted in its entirety from PC Magazine, January 14, 1986, ©1986 Ziff-Davis Publishing Company.

For more information and the location of the Ansa PARADOX dealer nearest you call 1-800-547-3000. Ask for Department No. 132. In Oregon or outside the U.S.A. call 1-503-684-3001.

You need a pretty good product just to break even in the database marketplace, but some people are betting that a new high-end database management system (DBMS) called Paradox will do much more than just break even, despite the tough competition.

Ben Rosen, a major backer of Lotus Development Corp.'s successful start-up, has given his financial imprimatur to the fledgling Ansa Software and its flagship product, Paradox, in the hope that 1-2-3's formula for success will work again. Success seems likely because Paradox's designers, Richard Schwartz and Robert Shostak, have intelligently recognized that the familiar sells. They have borrowed the best elements of the market leaders and combined them into a product that goes beyond the best-sellers while remaining compatible with them. Ansa is marketing Paradox as a "better" alternative to popular products and as an "upgrade" for 1-2-3 users who want more DBMS power and users who want a better visual interface and an expanded programming language.

Paradox borrows 1-2-3's two-line menu interface and cell format, offers a dBASE III-like structured programming language, and takes some advanced features from Microstuf Inc.'s highly rated Infoscope DBMS, such as its ability to modify the size and contents of database fields using on-screen graphics. 1-2-3 and dBASE users will quickly find themselves at home with Paradox and will easily be able to exchange files between the new program and their old favorites.

Paradox is friendly, fast, and loaded with features. It also requires a lot of memory to run, eating RAM and disk storage space like IBM consumes Intel chips. According to its manual, Paradox needs 512K bytes of RAM to run, and the program will let you know right away if all that space isn't available. If you have insufficient RAM, Paradox will put an error message on the screen and refuse to sign on. You also have to increase the number of files and buffers reserved by the system. FIG.SYS command when the system boots, or Paradox won't have enough space to work. Forget about RAMdisks of any practical size. You might even find it hard to use print spoolers in RAM or RAM-resident programs waiting to take control of the screen.

You can run Paradox on a floppy-based PC, but if you want to create applications that do a lot of computations in arrays, you had better also allow a free megabyte of hard disk storage space for Paradox to write the array data. It's a great excuse for upgrading your system because it gives you a lot of power in exchange for all those bytes it eats.

Paradox can do big jobs. A single data table can have up to 65,000 records, and because the program allows multiple tables, you will surely run out of data storage space before the program runs out of data-handling ability. It can do fast, informal inquiries into more than one table at once and combine the results for placement into a

Frank J. Derfler, Jr., is a contributing editor of PC Magazine.

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When you have your eyes and ears open, you can't guarantee you'll observe only things that are relevant to the official problem. Nor can you guarantee that you'll only affect things that are considered relevant.

management to swallow straight, I'll sometimes agree to come as a "speaker," provided there are many opportunities for unstructured consultation with members of the audience. I'll sometimes come as a "consultant," if I can avoid looking too much like a tool of management, which could destroy my usefulness as a juggler.

I may eventually become too closely involved with the organization's typical modes

of thinking and problem solving, and when that happens, I may lose my effectiveness as a juggler. In such a case, I have to call on one of my own personal jugglers. If you're intent on jiggling others, it's important for two reasons that you experience being jiggled yourself — first, so you'll get unstuck, and second, so you'll know how it feels.

Because I've been jiggled many times myself, I have a sense of what kind of jig-

gling works best. Over the years, I've come to believe that the effectiveness of jiggling is governed by one simple law: Less is more.

This is The Law of the Jiggle, sometimes called The First Law of Intervention.

In most cases, the only jiggling that's required is a tiny modification in the client's way of seeing the world. But how can we make such a change in a stuck system?

The elephant

We're all familiar with the story of the blind people who tried to ascertain the nature of an elephant: Depending on what he first touched, each person got a different view. An elephant was like a tree, a snake, a rope, a house, a blanket or a spear, with nobody able to grasp the entire picture. This fable reminds me of my clients' views of their own organizations.

Each person sees a part of the whole and identifies the whole with that part. Often, my biggest job is getting the client to accept that other views are possible.

How do I go about doing that? Well, how would you teach blind people about elephants? You could, of course, tell them about elephants, which is what most consultants do.

There's nothing wrong with telling, but it's surprisingly difficult for blind people and sighted people to communicate about their worlds. Their experiences are so different that simple words mean different things. What does a blind person understand from the simple phrase, "That's a gray area in the specifications"?

The same is true for consultants and clients. For instance, most of my clients simply don't know what it's like not to have a boss. If they do know, their picture is highly romanticized. Conversely, I once had a job, but that was so long ago I've lost touch with what it means to be an employee in a large organization.

Shared experiences

Before people can communicate effectively through words, they must have shared experiences. We might lead blind people around the elephant, allowing them to touch each part in turn, so that the entire group could experience the elephant. Companies that rotate their employees through different jobs and departments seem to develop workers with richer perspectives.

When consulting, I usually try to take a tour of the entire organization, and, if possible, I get a person from one division to escort me to the next. Often, the escort remarks that the incidental trip to another division was the most significant part of my visit.

I can achieve a similar

form on the screen or printer. You can use the formal programming language to design input screens and function menus and to write complex data inquiries resulting in formal reports.

But *Paradox* queries don't have to be just informal (temporary programs) or formal (permanent programs). You can quickly create permanently recorded inquiry macros tailored to a specific application that you can replay with a single keystroke anytime you need them.

1-2-3 or *Multiplan* users will feel familiar with the *Paradox* two-level horizontal menu, which uses the second line to explain the features highlighted in the top line. The cursor movement and command selection methods are the same as those in *1-2-3* and *Multiplan*, but you bring the menu to the screen by touching the F10 key instead of the slash (/). The F1 (help) key brings up screens of text that follow the *1-2-3* pattern of allowing you to branch to explanations of other related subjects. Ansa has even supplied a hard plastic *Paradox* function-key template (similar to the one Lotus supplies with *1-2-3*) that describes key assignments in the Alt and unshifted modes.

Like *1-2-3*'s own primitive database, *Paradox*'s primary interface uses a spreadsheetlike format that lets you see the horizontal and vertical relationships of records (rows) and fields (columns). Some database systems only allow you to write lines of program code in which you describe these records and fields in words. *Paradox* shows you the columns and rows and allows you to enter, retrieve, and manipulate data according to these horizontal and vertical relationships.

Advanced *1-2-3* users will appreciate *Paradox*'s ability to build macros. The Alt-F3 key combination tells the program to record the keystrokes that follow. You can run through a complex sort-and-retrieval using the menu or issuing commands, and the program will capture every keystroke. Keying in Alt-F4 plays the recorded keystrokes back. A menu selection lets you attach the "recording" to a particular key combination so that you can replay it any time you need it.

Although *Paradox* has many features in common with *1-2-3*, it's not just another *1-2-3* clone. Nor does it do all that *1-2-3* does by any means: *Paradox* has math functions, but it does not claim to be a spreadsheet. *Paradox* doesn't have *1-2-3*'s graphics or its ability to easily create extended formulas that apply to only one cell.

Paradox goes beyond *1-2-3*'s database capabilities to match such full-function DBMS programs as *dBASE III*. It can work on more than one table at a time and on more data than can be held in RAM. It also has a full-featured procedural language, the *Paradox Application Language* (PAL), which has a syntax and program

structure similar to that of the *dBASE* language. PAL's commands are often identical or quite similar to the corresponding *dBASE* words, but it has more of them.

If you are a *dBASE* programmer and you keep Ansa's cross-reference guide at your elbow to tell you that INPUT has become ACCEPT and LIST has become VIEW, you'll be able to start writing PAL code right away. You will probably like *Paradox*'s built-in functions, which let you check the status of a specific disk drive, find the name of the current active directory, and check the keyboard buffer for characters that might otherwise be lost. You might also find uses for the *Paradox* features that build arrays and perform trigonometric and statistical functions, including logarithm arccosine, arctangent, maximum, minimum, average, and standard deviation.

PAL has excellent functions for controlling the printer and constructing data input or report screens that take full advantage of the PC's display, whether color or monochrome. It is a very complete DBMS language, but unlike other such complete languages as SQL, it's easy for someone raised on BASIC or Pascal to use.

Paradox's high-quality screen displays help you edit data, change the way answers to your inquiries are displayed, and actually make the inquiries. A unique image-scrolling feature also lets you see how you got to where you are and go back through the looking glass to change what you did.

This on-screen editing is a real boon to DBMS users accustomed to programs that let you review and edit data only record by record, which is like sorting through a stack of 3- by 5-inch cards one at a time. *Paradox* lets you take a full-screen look at your database and then move around to spot errors or change data with an on-screen editor. Edited data becomes a permanent part of the database.

You can also use the screen-display command ALTER to change the configuration of the displayed tables you get as answers to data queries. If you have made a query into the database and the answer is a large display of records, *Paradox* will allow you to change fields around, alter the size of fields, and generally reconfigure the resulting table to meet your immediate needs. Unfortunately, *Paradox* will not allow you to make permanent changes to the configuration of the database through on-screen manipulation as *InfoScope* will and it doesn't use color as well as *InfoScope*, but ALTER is valuable for displaying practical answers to your database queries.

The program also has an interesting screen display that will help you make informal queries. *Paradox* displays an image of the fields available and allows you to place a check mark (created by special programming of the F6 key) in the fields holding data you want to see. You can also set

conditions in the fields such as >= 10,000 or = Smith. You can put conditions on every field or just put limiting conditions on one field: >= 100, <= 500 will show you all records with amounts between 100 and 500 in that field.

This informal query procedure lets you set either-or conditions such as "live in California or drive a BMW" and have the flexibility to handle upper- and lowercase entries and other variables. The process is easy to use and fast.

Putting data into *Paradox* is a joy. *Paradox* has an excellent data import and export function that can easily and quickly handle *1-2-3*, *Symphony*, *dBASE II* and *III*, *PFS:FILE*, and *DIF* (*VisiCalc* and others) and ASCII files. I created and exchanged files with *1-2-3* and *dBASE III* with no problems. Importing the PC Magazine Labs test files took only a few minutes. *Paradox* even found the two records with incorrectly formatted data and presented them for correction.

Unlike the frustration of report writing in many other DBMS languages, *Paradox*'s easy information retrieval was a pleasure. After a few retrievals for training, I could select four or five fields from three data files and have them correlated, sorted, and displayed in less than 2 minutes.

To produce reports summarizing or manipulating data drawn from several files, I used a *Paradox* menu selection called Report. The Report function displays the form on the screen and allows you to insert and write the specifications for new fields as quickly as you could in a spreadsheet. It takes about 2 minutes to make the request and less than a minute for it to appear on the screen.

I performed all the PC Magazine Labs benchmarks using *Paradox*'s menus and special function keys—I didn't have to use PAL for any of these retrievals or reports. I am convinced that even an expert *dBASE* programmer could not have created the application more quickly in code than I did on the screen. However, anyone using PAL would be able to do more complex mathematical functions and format printed reports better in code than I could on the screen. Programmers could also create better security protection for files and screens that make better use of color.

Ansa's copy-protection scheme gives you a choice between flexibility and ease of use. If you run an installation routine, you can put *Paradox* on your hard disk and not have to keep a program disk in drive A: for verification when you want to fire up the program. If you install the program, you will have to uninstall it before you can move it over to another machine. (The data files you create are portable.) But if you want more flexibility, you can just move the program files over to the hard disk and keep the original disk in drive A: for verification when *Paradox* signs on. In this

way, you can have one copy of the program that you can run at home or in the office—but not in both places at once.

Paradox's excellent manuals include clear illustrations of the screen and keyboard and references to other related topics. I particularly like the two slim volumes of special information included for *1-2-3* and *dBASE* users. Armed with the appropriate volume, anyone familiar with either of these programs can be effectively using *Paradox* in minutes.

I was able to do complex work with *Paradox* minutes after I inserted the first disk, but after spending 7 full days working with the program, I was still finding important features. *Paradox* is obviously the result of years of effort. It shows the signs of true class in the way it smoothly handles errors (polite English prompts) and quietly keeps files of changed data so that you can recover from dumb mistakes.

To qualify as a Category 4 database under PC Magazine's classification scheme, a DBMS must have a method of doing informal queries with Boolean conditions, such as IF, THEN, or ELSE, and it must also have a procedural language. The procedural language must contain structures such as loops and GOTO statements and enable the programmer to build applications that nonprogrammers can use interactively to enter and maintain database files. *Paradox* meets these criteria.

Category 4 products must also in some way set a standard in microcomputer database design. *Paradox* meets this test through its provisions for on-screen visual interaction with the database and its attempts at compatibility with widely used programs from other companies.

Other members of Category 4 include *dBASE III*, *KnowledgeMan*, *Power-Base*, and *INFORMIX*. On the whole, *Paradox* can match or exceed the performance and features of any of these programs. It does, however, lack the natural-language features of *KnowledgeMan*, *INFORMIX*, and some other Category 4 programs that let these programs parse phrases entered in ordinary English looking for important discriminating words while ignoring unimportant articles and adjectives. *Paradox* substitutes an efficient visual checklist for typed queries and neatly sidesteps the need for natural-language recognition.

Paradox is impressive on the surface, and the deeper you go, the more the feeling grows. It is fast, capable, easy to learn and use, and well documented. It also costs a steep \$695 and takes a fully stuffed PC to run. This price (the same as *dBASE III*'s) shows that *Paradox* is aimed at Ashton-Tate's heart. Even at those prices, neither product is perfect for every application, but *Paradox* is easy to use and offers high-end programming power that should attract the attention of many corporate, government, and institutional buyers.

PARADOX™
Relational Database by Ansa Software

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effect through mixed meetings, putting people from two or more groups together. Mixed meetings are ostensibly a way of "saving my time," for which the client pays by the hour, but actually they are a way of getting groups to experience more of the whole organization.

Elephants and organizations are so big that it's hard to experience them whole. Sometimes, it helps to experience a scale model, such as a carved elephant or a simulated small organization, so I might give my blind friends a baby elephant or a newly formed organization to study.

These ways all are excellent, but fall far short of the best way to teach blind people about elephants. The best way would be to actually cure their blindness. Unhappily, we can seldom cure the visually blind, but I can often cure my clients' perceptual

hang-ups. Although I use a lot of show-and-tell and I simulate direct experience in order to facilitate their understanding, my favorite method is to open clients' eyes to new ways of seeing things. Once their eyes are open, they'll continue to learn new things about elephants long after they've stopped paying my fees.

The hippopotamus

By "new ways of seeing," of course I don't necessarily mean seeing with the eyes. There is an ancient story of a king who wanted a formula for turning lead into gold. He threatened his alchemist with death if he didn't produce such a formula, so the alchemist gave him a complex series of magical steps to perform. The king memorized the steps, then asked the alchemist if the formula was foolproof.

"Absolutely," the alchemist replied, "except. . ."

He hesitated, and the king demanded, "Except what?"

"Oh, it's really not significant. It couldn't possibly happen."

"What couldn't possibly happen?"

"Well, it's completely unlikely, but there's one thing that will ruin the formula. While you are carrying out the steps, you must not think of a hippopotamus."

By this clever trick, the alchemist saved his life by putting the responsibility for failure on the king.

I do the same thing when I tell a client: "Don't be aware of your feet pressing on the floor." As you read that sentence, what happened? One moment you were seeing words on the page, shutting out most other aspects of your internal or external environment; the next moment, your

awareness changed, making it impossible for you not to be aware of your feet pressing on the floor.

I use this approach when trying to get clients to use nonverbal behavior more effectively. Most of us are more or less blind to nonverbal behavior. If I talk about it, many people simply don't know what I mean, much as a blind person would be mystified when told that an elephant is gray. After several direct experiences with their own nonverbal behavior, however, my clients no longer hold the concept of nonverbal behavior as a total abstraction.

Internal behavior

We live in a culture dominated by talking, which is why we tend to be blind to a person's external behavior. Internal behavior, of course, is even less visible. Most of the time, we don't see our own internal behavior, and we almost never see someone else's directly. With training, however, we can begin to see what might be going on inside someone else and how that might be quite different from the person's external presentation.

Almost all of my consulting is conducted in some sort of meeting. If I can improve a client's meeting effectiveness, my consulting task is simplified, and the client retains the benefits long after I've gone. The hidden agenda is one of the techniques I use to train people to "see" inside others. I use the following technique.

Before a meeting begins, I give each participant a sheet of paper on which is written a secret personal assignment for that meeting. Here are some examples of such secret assignments:

- Try to see to it that every decision made in the meeting is written down and displayed so all can view it.
- Make sure that every person gets a chance to talk on every topic.
- Don't let any single person or clique dominate the meeting.
- Pretend that you have not prepared for this meeting, and try to conceal that fact from everyone else throughout the entire meeting.
- If at all possible, see that the meeting comes to decision X without letting yourself be identified with that decision.

The typical secret assignment describes something that people normally do in meetings, with some assignments having a positive effect, some negative and some neutral. By playing the role explicitly, the actor learns to see behavior that was previously invisible or to see alternative interpretations for behavior that was previously visible. This new vision inevitably affects a person's future understanding of meetings.

Two secret assignments I frequently use are these:

- Pretend you have another meeting to attend following this one. You very much want to attend the second meeting, so do everything you can to make this meeting end as quickly as possible.
 - Pretend you have another meeting to attend following this one. You very much want to miss that meeting, which you can do if this one runs overtime. Do everything you can to make this meeting last as long as possible.
- By giving each of these to different people in the same meeting, I make it possible for everyone to see

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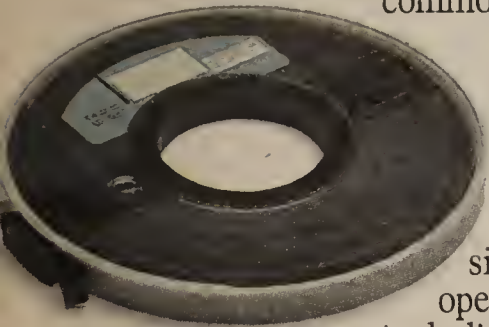
How to know when your HPTM 3000 needs more memory.

It's ironic, but the more things you add to increase your HP 3000's productivity, the more you can actually slow it down.

That's because all those upgrades and enhancements require additional main memory. And without it, your system becomes sluggish and less responsive.

Five common reasons why you may need more memory.

While there are many reasons why your system may need more memory, five of the most common ones are:



1. Adding more users to the system;
2. Upgrading to a new revision of the MPE-VTM operating system, including U-MITTM;

3. Adding or utilizing disk caching. Too often, information that should be in main memory ends up exiled to disk memory;

4. Moving up to HP's new enhanced Turbo-IMAGETM or any other database management system;

5. Running software applications that "hog" your system's memory. These including HPWORDTM or other word processing programs... graphics packages like HPDRAWTM... and spreadsheet packages such as 1-2-3TM or VISICALC/3000.

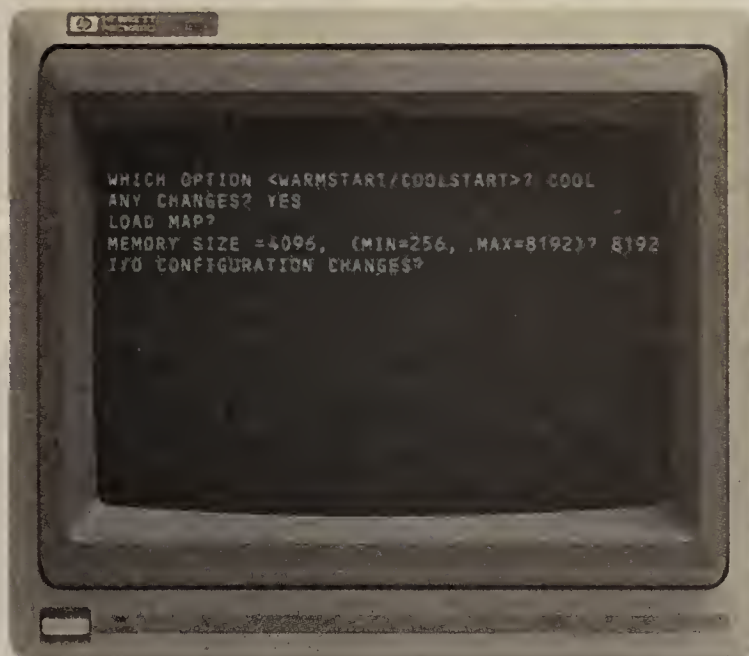
All of these additions to your system require varying amounts of additional main memory to maximize your HP 3000's performance and get the most out of your new software.

Add-in memory gives your system an instant boost in speed, performance and productivity.

The question then is, "Which memory boards should you choose?"

While your first response may be to call Hewlett-Packard, an even better response is to call EMC.

To start with, EMC offers you more memory sizes to choose from.



1MB, 2MB and 4MB for models 37 through 58. And 1MB and 4MB for models 64 and 68.

More importantly, every EMC add-in memory board comes with an *unconditional lifetime warranty*, the only one in the industry.

Our memory boards are designed with fewer components than HP boards. So they're inherently more reliable and consume less power. In fact, EMC was the very first company to manufacture high-density memory for the HP 3000.

Every single board we make undergoes 100 hours of rigorous testing and burn-in—including 24 consecutive hours of CPU qualification in our own dedicated HP 3000s.

As a result, unlike HP, we have *no maintenance charges* of any kind.

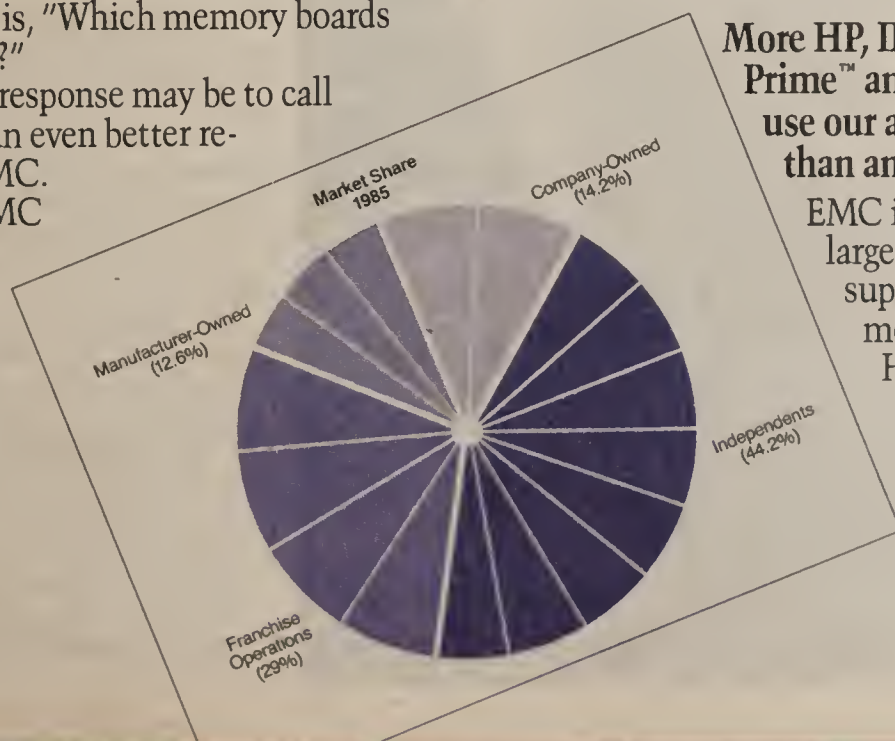
If you even *suspect* a problem, just call our special toll-free number and we'll rush you a new board *within 24 hours*—absolutely free.

Since EMC memory is *100% plug-compatible* with your HP 3000, it supports all HP memory diagnostic routines. Installation takes only 10 to 15 minutes (you can even do it yourself) and does not affect your HP maintenance agreement in any way.

And while EMC memory gives you a lot more, you pay a lot less to get it. Our prices start at *40% less* than comparable memory boards from Hewlett-Packard.

More HP, IBM,TM DEC,TM PrimeTM and WangTM users use our add-in memory than any other.

EMC is the world's largest independent supplier of add-in memory for HP 3000,



IBM System/38, DEC VAX,TM Prime and Wang VS minicomputers.

And every memory board we make for every make of computer comes with our same unconditional lifetime warranty.

Among the companies that have helped make us Number One are Shell Oil, Citibank International, Xerox Corporation, General Mills, Rockwell International, Ford Motor Company and many other Fortune 500 companies.

Send for free study showing effects of memory availability on HP 3000 performance.

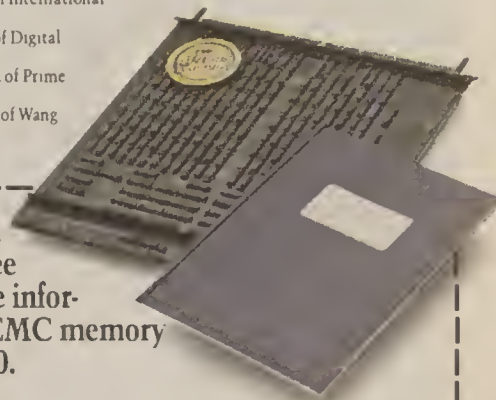
EMC has just released an independent study that examines the effects of memory availability on HP 3000 performance.

This 24-page study discusses the effects of the operating system, memory management, disk caching and other factors on system performance—and offers valuable suggestions to help isolate problem areas and fine-tune your system to maximize its productivity.

For your complimentary copy of this in-depth study—or to place an order—simply call the toll-free number below today. Or, send the coupon to EMC Corporation, 12 Mercer Road, Natick, MA 01760.

For your free study or to order, call today:
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(In MA, call 617-655-6600)

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YES, send me a copy of your free study and more information about EMC memory for my HP 3000.

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No one is more committed to memory.

CW 2-17

In Depth/Secrets of Consulting

how the conflict works out. At the end of the meeting, I post a list of the secret assignments and ask the observers to guess who had which.

Without fail, the person assigned the "quick meeting" agenda is misidentified as the "prolonged meeting" person!

This happens because every attempt to rush the meeting — such as cutting speakers short, streamlining procedures or pushing for quick votes — starts a conflict that prolongs the meeting. The person assigned to prolong the meeting finds that it's unnecessary to do anything: The job can be left to the "quick" person.

Seeing feelings

Through this experience, participants learn the specific lesson that the best way to speed a meeting's

progress is simply to keep quiet. But more important, participants change their way of seeing what people do in meetings and learn that the outward actions very often are precisely the opposite of the inward intentions. In doing so, they have made a small start toward seeing "inside" another person.

Even though clients learn a little

”

Even being a trigger carries a certain responsibility. We can't just waltz through the world triggering changes without caring about the consequences. Otherwise, we're no better than used car dealers who won't service what they sell.

about seeing other people's thoughts through this exercise, they still might be unaware of others' feelings, or even of their own feelings. For a consultant, seeing feelings is more important than seeing thoughts, but many people are as blind to feelings as they are to X-rays.

In order to get people more in touch with themselves, I used to ask

them to write down their feelings in a personal journal. Sometimes, fully half of the people would stare blankly, writing nothing. They had no idea of what would be written under the heading of "feelings."

Nowadays, we help clients get started with a list of words such as love, hate, disgust, affection, sadness, joy, pity, anger, sympathy, heat, cold, comfort, misery, nervousness, itchiness or frustration.

A fellow consultant starts them off with a simpler list of five feeling words, all of which rhyme: sad, bad, mad, glad, and sca'd (Southern for "scared").

The list of feeling words expands people's ability to see inside themselves, but for some, this is still not enough. Although I've had dozens of participants tell me "I'm not feeling anything," it usually turns out that they are actually blind to their feelings.

The powerful consultant

If a consultant keeps amplifying his impact, he'll eventually become a more powerful consultant. His consulting style will reflect an increasingly complex understanding of his task.

Being a powerful consultant may sound desirable, but there are great dangers implicit in this approach to consulting. Since the most powerful method of helping other people is by helping yourself, model consultants tend to influence people by their very presence, even when their influence has not been requested.

In a sense, once you become an effective consultant, you cannot go backward. You cannot really be ineffective in a situation, even if you want to be.

At times, I have found myself talking casually for an hour or two to my seatmate on an airplane. At the end of the flight, often my seatmate says, "After talking to you, I know that things are going to be different in my life."

I've had strangers decide to visit a marriage counselor, change jobs, change majors in college, write a letter to a parent they haven't talked to for seven years, modify an international marketing strategy, refuse a tempting job offer and many other smaller changes, all as a result of a few hours of talking.

A potentially dangerous person

This kind of influence used to frighten me. As I amplified my impact, I became a potentially dangerous person. Eventually, I understood that I was suffering from grandiosity.

My role in these changes was almost trivial. These people were on the brink of making these changes, and if I hadn't sat next to them today, somebody else would have done it tomorrow or the next day. I was, at most, their trigger.

I know this model is correct because powerful consultants have triggered me in the same way. But even being a trigger carries a certain responsibility. We can't just waltz through the world triggering changes without caring about the consequences. Otherwise, we're no better than used car dealers who won't service what they sell.

At the very least, you need to understand about change — how it happens, how it doesn't happen and how it can be effected more gracefully.

Here's how to join the new leaders in Supercomputer technology:

Would you rather work *with* the Convex Supercomputer, or *for* it? Either way, you would be immersed in the system of first choice in affordable, high performance, scientific computers.

Dr. Paul Schneck, Director of the Supercomputing Research Center (SRC), put it this way:

"As the newest division of the Institute for Defense Analyses, SRC is building a team of leading computer scientists, engineers and mathematicians to apply their skills to vital matters of national security. We'll be using the Convex C-1 alongside our other computing equipment in research focusing on algorithm, software and language design, plus creating experimental parallel processors. The advanced Convex system is helping us attract the top calibre people we need."

Steve Wallach, one of the founders of Convex Computer Corporation, agrees:

"We've kept our pioneering promise to develop the first affordable supercomputer. Like Dr. Schneck, our customers are putting the C-1 to the challenge

in theoretical research applications, as well as signal and image processing, C³I, plus structural and seismic analysis. And, like Dr. Schneck, we are providing opportunities for more and more hardware and software achievers to help us accomplish even more."

For full details on the supercomputer that delivers one-fourth the power of the Cray for about one-tenth the price, write or call Convex today.

And for computer science professionals interested in working with this exciting technology take your choice. Contact Dr. Paul Schneck, Director, SRC, 4380 Forbes Blvd., Lanham, MD 20706, or Mr. Peter Delisle, Vice President Human Resources, Convex Computer Corporation, 701 N. Plano Road, Richardson, TX 75081, (214) 952-0200.



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NEW PRODUCTS

High-density tapes out for DG minis

Satisfy requirements of Nova, Eclipse, MV

Interscience Computer Services, Inc. of Chatsworth, Calif., has introduced a product line of high-density tape systems for Data General Corp. minicomputers.

The products, the Interscience S210, T350 and T375, are said to meet the data capture, retrieval, interchange and backup requirements of DG Nova, Eclipse and MV series users.

The Interscience S210, with a density of 6,250 bit/in., is said to offer both 50 in./sec. start/stop capability plus a 100 in./sec. streaming mode. The vendor said it features automatic threading. Recording formats are reportedly ANSI compatible.

Disk dump/restore, interchange, archiving, journaling and batch processing are supported in 50 in./sec. mode with no special software modifications. Write access time is 6 msec, and reposition time is zero. Both forward and backward read operations are supported with no repositioning required.

The S210 comes complete with tape transport, formatter electronics, channel interface and resident microdiagnostics in a single self-contained package.

The Interscience T350 and T375 series tape subsystems feature 800, 1,600 and 6,250 bit/in. tridensity operation at either 50 in./sec. or 75 in./sec. tape speeds. They also are said to offer full ANSI-compatible start/stop performance. They have a write access time of 3 msec with no reposition or turnaround delay.

According to the vendor, the T350 and T375 subsystems are vacuum column machines, incorporating column geometry said to result in low power consumption and quiet operation. Automatic rapid-load tape path threading and column loading is a standard feature.

Prices for the product line range from \$10,000 to \$20,000.

Kaypro consolidates series of personal computers

Kaypro Corp. of Solana Beach, Calif., has announced that it is consolidating its product line of personal computers.

Kaypro is introducing a hard-disk version of the Kaypro PC. Priced at \$1,895, the IBM Personal Computer XT-compatible computer features a 20M-byte internal hard drive, a double-density 360K-byte disk drive, 256K bytes of internal memory, which is expandable to 768K bytes, and an IBM Personal Computer AT-compatible keyboard.

The Kaypro 16E series provides IBM compatibility, rugged portability and increased standard memory. The Kaypro 16/2E dual-disk-drive model and the Kaypro 16E with its 10M-byte internal hard drive offer 768K bytes of internal memory. Both feature red-green-blue composite video outputs and typewriter-style keyboards.

The Kaypro 16/2E costs \$1,795, and the Kaypro 16E costs \$2,695.

The Kaypro 2861 IBM Personal Computer AT-compatible line will be consolidated to include Model A and Model C only. Model A offers 512K bytes of random-access memory (RAM), and Model C offers 640K bytes of RAM, an internal 20M-byte hard disk drive and a 1.2M-byte high-density floppy drive.

The vendor has also enhanced its Kaypro 2000 laptop by increasing the internal memory to 768K bytes. The laptop is priced at \$1,995.

The Kaypro 1 is being replaced by the Kaypro 2X Digital Research, Inc. CP/M computer. Priced at \$1,295, the Kaypro 2X has dual 392K-byte disk drives and a 9-in. screen. The Kaypro 10 is being discontinued, the vendor said.

Pinpoint unveils initial offering of retail terminal series, software

Pinpoint Retail Systems, Inc. of Toronto has launched a series of retail terminals capable of automatic electronic funds transfer.

The terminals and related software are the first product line of the 1-year-old company. The terminals are said to combine credit authorization, communications and credit card imprinters into a cash register-type terminal, eliminating the need for separate credit authorization devices.

Based on multiple Intel Corp. 16-bit microprocessors, the terminals are governed by a layered, Unix-like operating system that controls point-of-sale activities, administrative tasks and communications.

The system, dubbed Utopia, can be custom-programmed by applications written for it on an IBM Personal Computer or Microsoft Corp. MS-DOS compatibles. The MS-DOS compatibility functions only on the top-of-the-line, Pinpoint 4000 terminal

hardware, company officials said.

The terminal is designed to read "in one swipe" a magnetically implanted credit card number, automatically dial up the correct credit authorization source and flash a clear or not clear signal to the checkout clerk. It has a 20-char. display and 130K bytes of memory.

Retail for \$3,000 to \$8,000

Terminals come in the 1000, 2000, 3000 and 4000 series and retail for \$3,000 to \$8,000, depending on configuration.

Also announced were a set of retail applications, called Retail Vision, including transaction management, audit, custom data capture, in-store reporting, communications and electronic mail.

Parameters are set in the applications at installation and can be updated to reflect changing business needs, the vendor stated.

INSIDE

Software & Services/68

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Systems & Peripherals/81

Price Reductions/84

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D.P. Operations Managers prefer SYSD because it eliminates expensive RJE devices and allows them to distribute data control functions to the user community. It gives them better control, greater throughput, quicker turnaround, and a reduction in CPU utilization.

Technical Services Managers trust SYSD because it matches the right tools to the user and also lets them off-load and better control TSO usage.

Applications Development Managers insist on SYSD because it makes their programming staff more productive. They can modify, compile and test programs without switching out of CICS.

D.P. Managers say SYSD saves CPU resources, provides better service, and allows them to get more out of their existing hardware investment.

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NEW PRODUCTS/SOFTWARE & SERVICES

**SOFTWARE
& SERVICES****Systems software**

Enhansys, Inc. has released Version 3 of Enhansys, which is said to extract and integrate data from incompatible systems for analysis purposes.

The release incorporates three features: user extractor specifications, an extension to Enhansys' line of Dig-

ital Equipment Corp. VAX-compatible products and a statistical analysis application called response surface modeling.

User extractor specifications are available for IBM and DEC applications for \$2,500 to \$8,000. DEC's Datatrieve and Decnet support for DEC-based products costs between \$5,000 and \$15,000, and Microvax II costs \$19,000. Response surface modeling is available on the Hewlett-Packard Co. HP

9000 Series 500 for \$12,500. Enhansys, 20111 Stevens Creek Blvd., Cupertino, Calif. 95014.

Unitech Software, Inc. has introduced Ucontrol, a software program said to provide comprehensive system administration for Unix-based computers.

Ucontrol offers system management capabilities in areas such as backup, re-

store, media management, system security administration, print spooling and batch job scheduling.

There is an automatic tel-ex communications management option for systems running in an international environment.

Prices for Ucontrol range from \$900 on a personal computer to \$8,000 on a mainframe.

Unitech Software, Suite 800, 8330 Old Courthouse Road, Vienna, Va. 22180.

Application packages

Bakco Data, Inc. has announced Release 5 of its Warehouse Distribution and Financial Control Software for the Hewlett-Packard Co. HP 3000 minicomputer.

Release 5 offers enhancements to the order management, accounts receivable, inventory management, warehouse management, purchasing control/receiving, accounts payable/cash management and general ledger/budgetary control systems.

Prices range from \$5,800 to \$25,700, including full documentation, source codes and support.

Bakco Data, Suite 100, 1417 Lake Cook Road, Deerfield, Ill. 60015.

Languages

Inference Corp. has released SMP Version 1.5, an upgrade of its high-level mathematical language developed for interactive symbolic computation.

Added features include the generation of reportedly error-free Fortran source code for SMP-developed problem solutions and algorithms, enhanced graphics capabilities and two-dimensional plots of graphs generated from SMP expressions.

SMP is available for the Digital Equipment Corp. VAX series with Unix or VMS, Apollo Computer, Inc. Domain and the IBM 370 line with VM/CMS.

SMP costs about \$15,000.

Inference, 5300 W. Century Blvd., Los Angeles, Calif. 90045.

IEM, Inc. has announced the Basic 200/300 compiler for the Hewlett-Packard Co. HP Series 200 and Series 300 computers.

The compiler runs under Basic Operating System Versions 3 and 4. It produces faster results than interpreted Basic. It offers increased security by producing Motorola, Inc. MC68000 native machine code, which prevents recovery of the original source code.

The compiler is delivered on one 3½-in. or 5¼-in. disk and comes complete with a users' manual. It costs \$595.

IEM, P.O. Box 1889, Fort Collins, Colo. 80522.

Utilities

TSI International has introduced an automatic program called Key/Master Conversion, which is said to convert 100% of its existing IBM Video/370 documents to full-function Key/Master applications.

The conversion process requires no programming, no reentry of data and converts

Continued on page 71

Attn: Mux Users

What is the best feature of a paradyne multiplexer?

Worldwide service organization

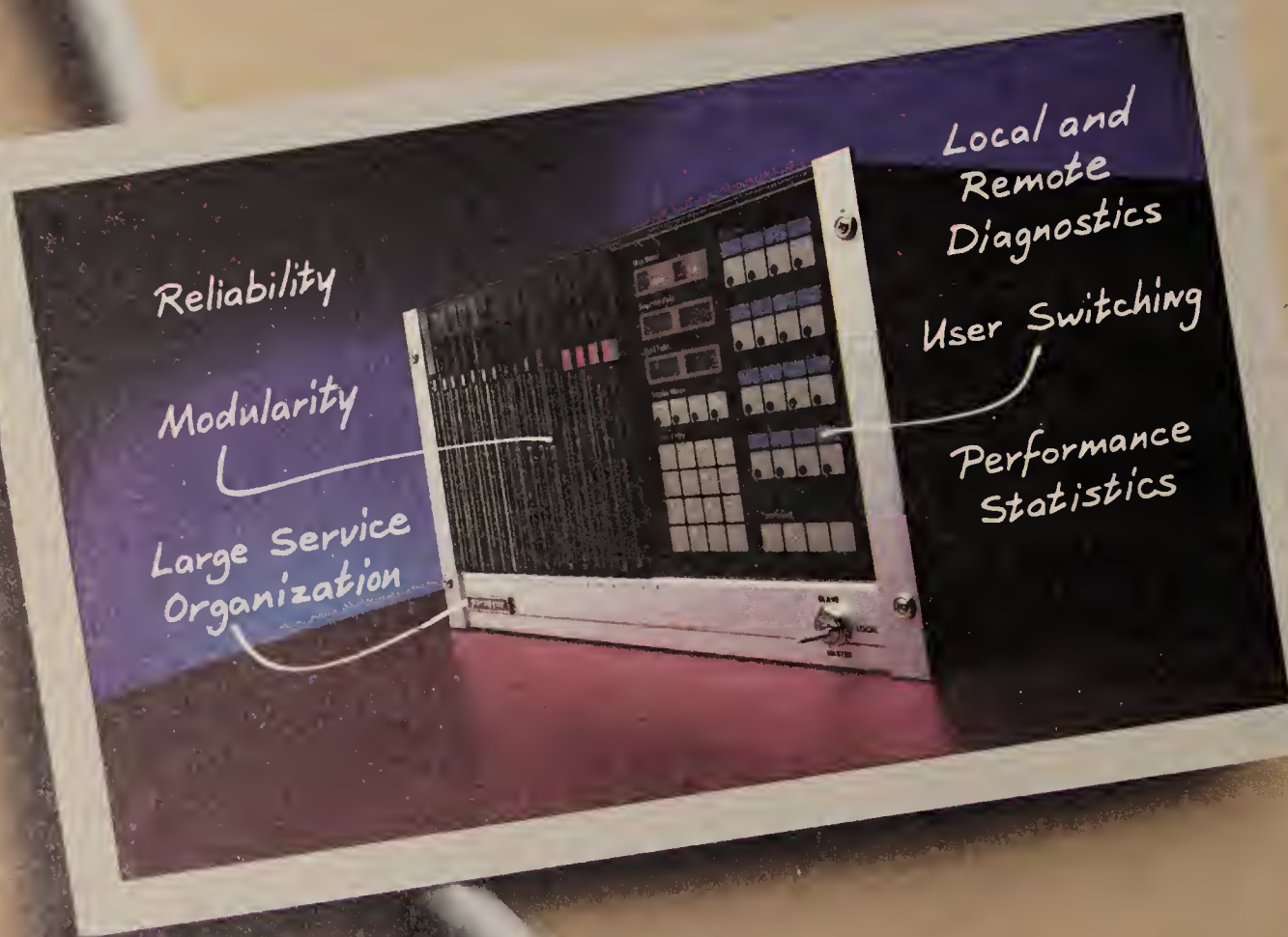
A Paradyne networking multiplexer has everything a stat mux should have, plus responsive service from a worldwide network of over 800 people. And 24-hour support. You get a complete family of reliable, flexible multiplexers. From 4 channels to 240. Right on up to T1. Call Susan Ricker to find out more.

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St. Louis, MO



Mary Krummenacher, Manager of Marketing Communications for Polygon, Inc., wanted corporate end users to know about their new IBM PC/VAX poly-COM/220 software communications package. She chose Computerworld.

Mary sums up their success: "In our business, when you advertise technical products like ours, the usual advertising responses are requests for more information. And that's all we usually expect. But not from Computerworld."

"People are actually ordering our products directly from the ads. And not just a few people — the response has been outstanding."

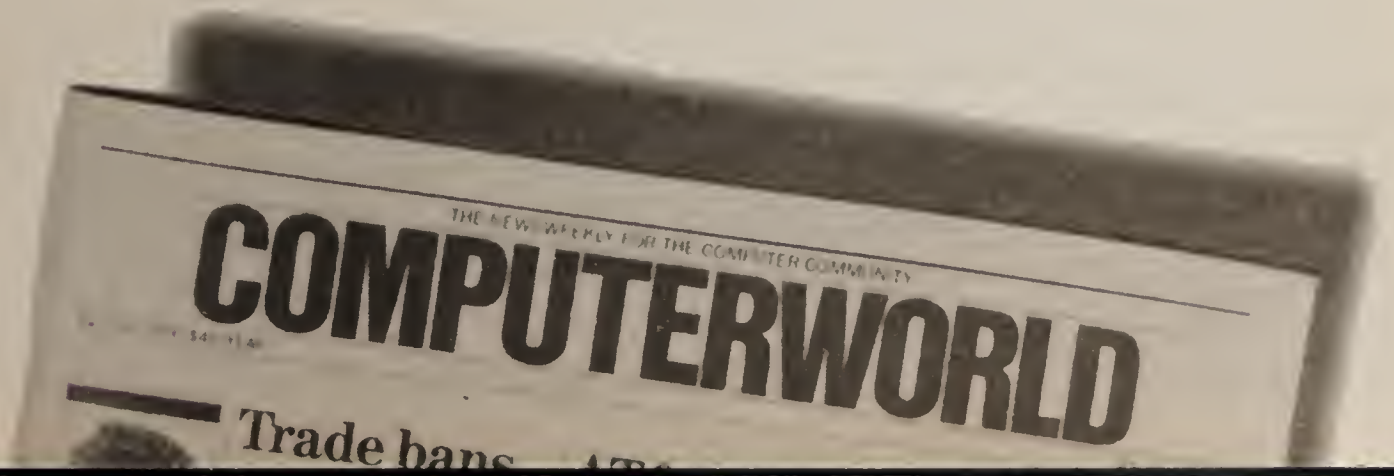
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Computerworld. We're helping more suppliers reach more buyers, more often, in the computer market. We cover the entire computer world. Every week. We're working for Polygon. We can work for you, too. Call your Computerworld representative for all the facts. Or call Ed Marecki, Vice President/Sales, at (617) 879-0700.

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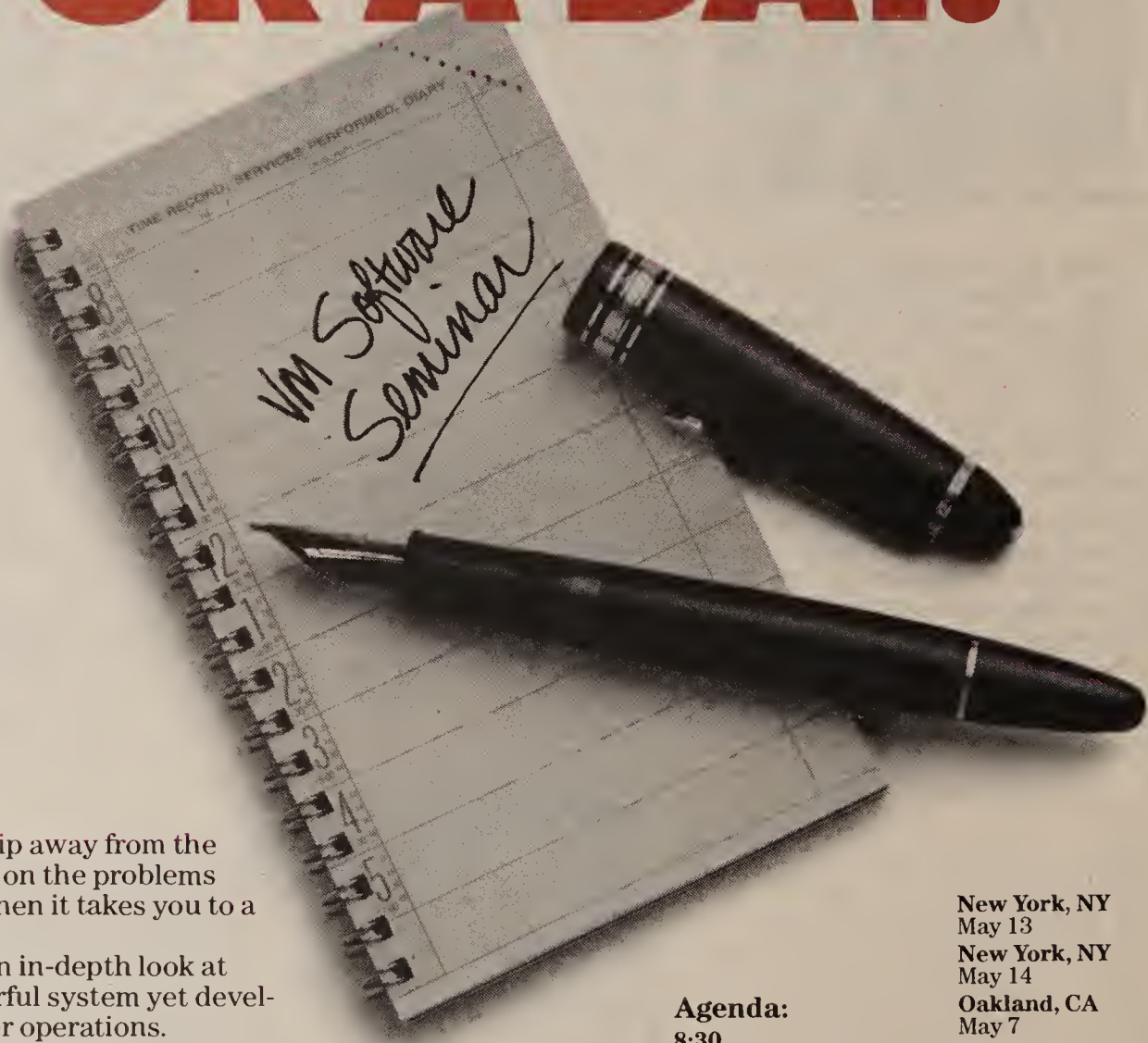
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You'll see how VMCENTER simultaneously addresses all your major concerns as a VM data center manager. System security, resource accounting and budgeting, workload balancing, disk and tape management, data recovery—plus much more.

You'll also get a chance to meet your fellow managers and system programmers. And get all the particulars on how they're handling situations similar to yours.

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Seminar topics include:

System Table and DASD Analysis—A VMCENTER utility that tells you who is using how much DASD by producing a consolidated map of all the DASD space on your VM system.

Minidisk Utilization Analysis—A VMCENTER utility that helps you to find more available DASD by creating exception reports to identify problems like underutilized DASD space, unformatted CMS disks, obsolete minidisks, and more.

Generalized Report Writer—a utility you can use to simplify the production of special reports if you need more than the 60-plus preformatted reports provided with VMCENTER.

You'll also see in-depth descriptions of the seven free-standing components of VMCENTER—VMACCOUNT, VMSECURE, VMSCHEDULE, VMSORT, VMBACKUP, VMARCHIVE, and VMTAPE.

And, we'll give you a preview of new developments to be released.

Cost:

Everything's free. Even lunch.

Agenda:

8:30
Coffee and Registration
9:00
Increasing Data Center Productivity
12:30
Complimentary Lunch

Seminar Dates and Locations

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May 1
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April 22
Calgary, AB
April 24
Cherry Hill, NJ
May 12
Chicago, IL
May 9
Cleveland, OH
April 23
Denver, CO
May 21
Detroit, MI
April 25
Hartford, CT
May 15
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NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 68

each application in seconds. It reads the source code defining the Video/370 document and converts it to a Key/Master data entry application.

The conversion program is offered free until May. After May, it will cost \$2,500. Key/Master is priced between \$18,000 and \$29,750.

TSI International, 295 Westport Ave., Norwalk, Conn. 06856.

■

Data 21 has announced that its CICS.Help package now supports IBM's DMS and CSP application development packages.

CICS.Help allows cursor-sensitive Help windows and screens to be added to CICS transactions with no program modifications, and it allows multiple CICS transactions to be run concurrently on a single terminal.

CICS.Help costs \$7,995 for MVS and \$3,995 for DOS environments.

Data 21, Suite 300-5, 3868 Carson St., Torrance, Calif. 90503.

■

Boole & Babbage, Inc. has announced XPF/Cobol 1.2, a tool for testing and debugging programs in a Cobol II environment.

XPF/Cobol 1.2 operates at the Cobol source-code level and can be used to test and debug batch, IMS and IMS on-line Cobol programs.

According to the vendor, all testing and debugging is achieved interactively on the terminal screen.

Features include a reporting option called the Execution Summary Report and the Allocate option.

XPF/Cobol 1.2 is priced at \$32,500 for both MVS/XA and MVS/370 systems.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Data base management systems

Software AG of North America, Inc. has released Predict Version 2.1, a new version of its dictionary system.

Added features include tools for administering multilevel data base schemes, enhanced facilities for enforcing data administration standards, automated generation of security and control information and functions for migrating dictionary information to and from Predict, according to Software AG.

Predict Version 2.1 is integrated with the vendor's Adabas data base management system and Natural fourth-generation development system.

Predict Version 2.1 costs \$20,000 for DOS/VSE, \$24,000 for DOS/VSE SP2, \$25,000 for VS1 and VM/CMS and \$30,000 for MVS environments.

Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091.

Carleton Corp. has released an enhanced version of its IDMS Database Interface, which includes the Active IDD facility.

According to a Carleton spokesman, the Active IDD facility allows Carleton's information retrieval and report writing packages to access Cullinet Software, Inc.'s Interactive Data Dictionary directly as a source of data definitions. The information retrieval tool is called CQS-Infotec, and the report writing package is called CQS-Auditec.

Users do not need to know the calling protocols, data manipulation language or internal data base structure to access IDMS, the vendor said.

The IDMS Database Interface with the Active IDD facility is priced at \$7,000.

Carleton, 245 First St., Cambridge, Mass. 02142.

Iskra Software International has announced Formatix Version 2.5 forms management system.

The latest version offers selective record retrieval and multiple field dynamic sorting. Formatix is said to be interactive and self-documenting. Record selection features are based on 10 fields of data using the logical AND operator. Formatix also contains a menu builder.

Formatix Version 2.5 runs on Digital Equipment Corp. VAX/VMS and ranges in price from \$2,900 to \$6,500.

Iskra, 222 Sherwood Ave., Farmingdale, N.Y. 11735.

■

Microsystems Engineering Corp. has announced its Mass-11 Manager, which is a relational data base management package.

agement package.

Mass-11 Manager reportedly offers a choice of menu or command modes, on-line Help, an application development programming language, technical editor and deleted records recall.

It allows substring searches, automatic updating of up to 50 indexes per data base file and multiple-field sort.

Relational operations include a Join capability and data selection from related files for output and display.

Mass-11 Manager costs \$5,750 on Digital Equipment Corp. VAX/VMS systems and \$995 on the DEC Rainbow and the IBM Personal Computer, according to the vendor.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195.

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 **INFOTRON** SYSTEMS

NEW PRODUCTS/MICROCOMPUTERS

MICROCOMPUTERS

Systems

Quadram Corp. has expanded its **Datavue** line of portable computers to include dual 3½-in. disk drives.

The **Datavue** is a 12-lb IBM Personal Computer-compatible portable computer with dual 3½-in. disk drives, a single 5¼-in. drive or two 5¼-in. drives and internal random-access memory (RAM) software, the vendor said.

A fluorescent, backlit **Datavue** with the new 3½-in. drives and 256K bytes of RAM costs \$2,095. With 768K bytes of RAM, it costs \$2,395, and with 1.25M bytes of RAM, it costs \$2,595.

Quadram, One Meca Way, Norcross, Ga. 30093.

Aurora Systems has announced the **Aurora/220**, a full color video graphics system.

Based on the IBM Personal Computer AT, the **Aurora/220** features a complete paint system. Also included in the **Aurora/220** video graphics system are 32-bit resolution, full color video input, separate graphical menu, two full canvas buffers, special effects techniques, character generation and expansion power.

Options available include 3-dimensional modeling with texture mapping, frame-by-frame animation with digital video tape recorder control and hard-copy output, according to **Aurora Systems**.

The **Aurora/220** costs about \$45,000, depending on configuration, the vendor said.

Aurora Systems, 185 Berry St., San Francisco, Calif. 94107.

Software applications packages

Interface Technologies Corp. has announced **Farsight**, the first member of an integratable family of business software applications for use on the IBM Personal Computer.

Farsight includes an electronic spreadsheet said to be fully compatible with Lotus 1-2-3 and a full function word processor, both of which are integrated by a proprietary window manager/operating environment.

The window manager allows multiple windows to be opened on the screen at any time and also allows data to be transferred from one window to another.

Farsight runs on an IBM Personal Computer with 256K bytes of memory, two floppy disk drives or a hard

disk. It costs \$99.95.

Interface Technologies, Suite 200, 3336 Richmond, Houston, Texas 77098.

Theta Design has announced **Social Security Benefits Estimator**, a software program for IBM Personal Computers.

The program is said to estimate all benefits payable upon a worker's death, disability or retirement. Benefits calculated include those for children, parents, spouse and disabled spouse. Current value of benefits received in future years is also calculated.

The program costs \$69.95.

Theta Design, Box 263, 484 Lake Park Ave., Oakland, Calif. 94610.

Genigraphics Corp. has announced **Graftime**, a business graphics software package for the IBM Personal Computer, Personal Computer XT, AT and compatibles.

Graftime uses preformatted business graphics and a forms-fill menu interface. It supports 14 different chart types and eight global choices for controlling attributes such as drop shadows and fonts.

Graftime costs \$395.

Genigraphics, P.O. Box 591, 4806 W. Taft Road, Liverpool, N.Y. 13088.

Cybernetics Index, Inc. has introduced **Project Planning & Control**, the first module in the Cybercorp Project Management Series designed to offer a library of project management solutions.

The module is said to provide a method for planning, accounting control and billing in managing many projects. The emphasis is on structuring and maintaining a data base with tracking of multiple projects for multiple clients in a controlled accounting environment. It includes over 40 reports.

The series runs on the IBM family of Personal Computers. The module costs \$795.

Cybernetics Index, 416 Hungerford Drive, Rockville, Md. 20850.

Software utilities

Kea Systems Ltd. has announced **Deckhand**, a set of utilities designed for users of Microsoft Corp. MS-DOS-based microcomputers.

Deckhand is said to bring Digital Equipment Corp.-like power and syntax to commonly used utilities such as Copy, Delete, Dir, Rename and Type. All the utilities include DEC VAX/PDP-11-type switches for full date processing, backup and flag processing.

Deckhand costs \$69.

Kea Systems, 412-2150 W. Broadway, Vancouver, B.C., Canada V6K 4L9.

Melrose Software Co. has announced a **software tool** for monitoring personal computers to obtain usage information.

The system uses a resident program that can keep track of usage by personal computer unit, individual user, project or task and department.

Continued on page 78

Communicate with the stars at Interface '86.

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Q. IF A MODEM IS A MODEM IS A MODEM, DOES IT REALLY MAKE A DIFFERENCE WHICH ONE I BUY?

A. The fact is, all modems are not created equal. For example, some modems are better signal processors than others. And these superior modems can make an important difference in your total network performance. A difference that can lead to important savings in telecommunications costs.

Q. How can a modem make a difference in my telecommunications costs?

A. The primary purpose of a network is to move information to and from end users and thereby improve their productivity. And a superior modem can improve the performance of your network in at least four areas: It can make your network more reliable. Give your end users faster response times. Minimize the time you and your people spend on network management. And a superior modem can also save you money in line charges.

Q. What makes a superior modem?

A. As you know, a modem converts a data stream into a signal that can be sent (usually over a phone line) from Point A to Point B.

Now that may sound simple enough, but there are a number of variables in that seemingly simple scenario. Such as, what's the distance between Points A and B? What's the line between the points? What's the condition and stability of the line? And many, many more. The fact is, each variable carries technical implications that affect the design of the modem. And simply stated, a superior modem enjoys a superior design.

Q. Be specific. How can a superior modem save my company money?

A. Let's face it, modems are not the most expensive part of your telecommunications network. Chances are, line charges are. If you design a modem that can send data more reliably, then that modem can begin to affect your line charges. Every time a modem has a "hit," or an unsuccessful transmission of data, the data must be retransmitted, slowing down response time. The net effect is a reduction in the amount of information carried by the network.

If you use superior modems that give fewer hits, you'll have lower line costs per data unit transmitted and better throughput. Better throughput translates into time and cost savings.

Q. Can a superior modem correct the problem of faulty lines?

A. A superior modem can go a long way toward compensating for poor line conditions—and thus make marked improvements in the hit rate.



Take the IBM 3865 Modem, for example. It contains a custom microprocessor with an advanced algorithm that in effect enlarges the target area of acceptable transmissions. The result is that this reliable 9,600 bps modem can operate very effectively over unconditioned lines. Now imagine all the line conditioning charges you won't have to pay your common carrier.

Q. What other modems does IBM offer?

A. With our new announcements (see box), IBM now offers a full range of modems from 2,400 bps to 14.4 kbps in stand-alone and rack-mounted models. There's also a limited distance modem that goes up to 19.2 kbps.

NEW IBM MODEMS

Q. What about higher speed modems?

A. We recently announced a new 14.4 kbps modem—the IBM 5866, and a new 9,600 bps modem—the IBM 5865. Both are available in stand-alone and rack-mounted models, and function in Communication Network Management (CNM) and non-CNM environments. They have multipoint capabilities, operate over unconditioned lines and now provide expanded line diagnostics.

Q. You mean I can even get phase jitter readings from an IBM modem?

A. Not just phase jitter, but readings for ten analog parameters that measure line quality. You can also do remote modem configurations and tests from the control modem.

Q. What about your limited distance modem (LDM)?

A. The new IBM 5811 is a compact, low-cost, non-CNM, baseband modem that operates over continuous wire or telephone cables. It offers synchronous transmissions at 2,400, 4,800, 9,600 bps and 19.2 kbps.

So if you're looking for reliable modems that are competitively priced, talk to your IBM marketing representative.

If you would like to receive free literature on IBM modems, call 1 800 IBM-2468, Ext. 90. Or use the coupon below. After all, it pays to be informed, because not all modems are created equal.



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Multiple Host Sessions—Up To 7 Combinations of Displays and Printers—Simultaneously (Available Only On AST-5251/11 Plus)



Multiple Printer Sessions, Including 5256, 5224 and 5225 Emulation On PC-attached Printer

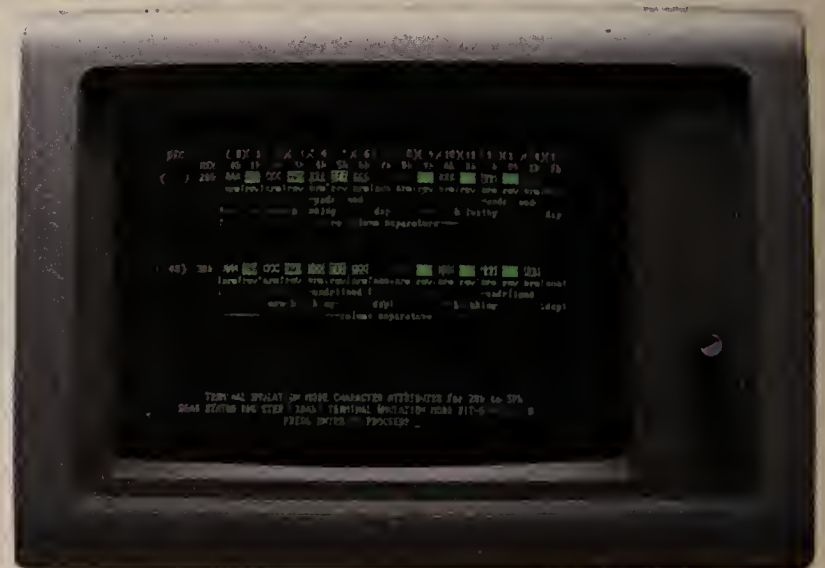
Programmable Printer Format Configuration



Bidirectional File Transfer



Automatic Sign-On With Password Security



Display Attribute Configuration

Now! Compatible With IBM® PC Support/36 Watch For Support/38

Build Your Smart Office The Smart Connection™ For

Loaded with the sophisticated features you need, we've just made our original AST-5251/11 even easier to use and more efficient for increased user productivity, and introduced an enhanced version too—AST-5251/11 Plus.™ Now you have lots of new reasons to make AST "The Smart Connection" for your evolving smart office.

Office Smarts—We've Got Them. At AST we've been building solutions for IBM® PC connectivity—the foundations of smart offices everywhere—long before it was a popular concept. You might say, with the over one million AST PC enhancements installed, over 20,000 PC to System 34/36/38 connections and the thousands and thousands of PC to IBM mainframe and local area

network gateway connections we've established worldwide, that we've already made a substantial commitment to helping people realize their fundamental visions of the "smart office."

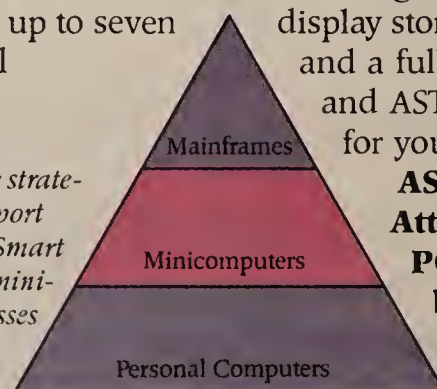
AST-5251/11—The Direct PC To 34/36/38 Connection. Standard twinax cable, just like IBM's, makes this connection the most convenient for you. Our Hot-Key support provides a toggle between PC DOS and two host sessions. And our new enhanced version, AST-5251/11 Plus, even allows up to seven System 34/36/38 sessions—all concurrently.

AST's family of smart connections are strategically focused and developed to support and evolve in concert with the IBM Smart Office architecture. Highlighting the mini-computer group here, AST also addresses connectivity in mainframe and personal workstation environments.

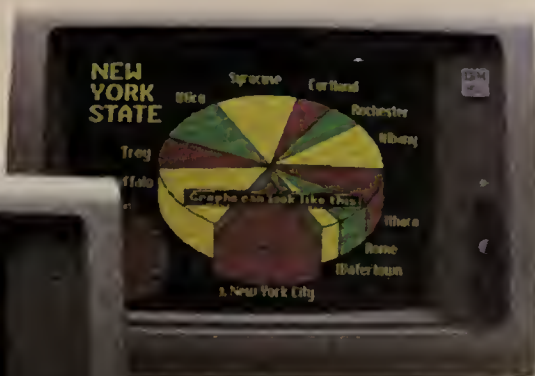
Our file transfer system means you can move host data to and from your favorite PC application software files, like Lotus 1-2-3®, WordStar® and dBASE.™ For easy integration of PC and host applications, we've included our Applications Program Interface (API).

Add all our features illustrated above—everything from bidirectional file transfer to automatic 34/36/38 sign-on with password security, multiple printer support including 5256, 5224 and 5225, snapshot display storage, keyboard mapping help, and a full line of companion products—and AST-5251/11 really spells smart for you.

AST-5250/Display™—Model 11 Attributes and Standard IBM PC Monochrome Display Capabilities. Used with your AST-5251/11 card, the AST-5250/Display makes your PC's



AST-5250/Display
Products For Full Model 11
Display Attributes And PC
Compatible Graphics



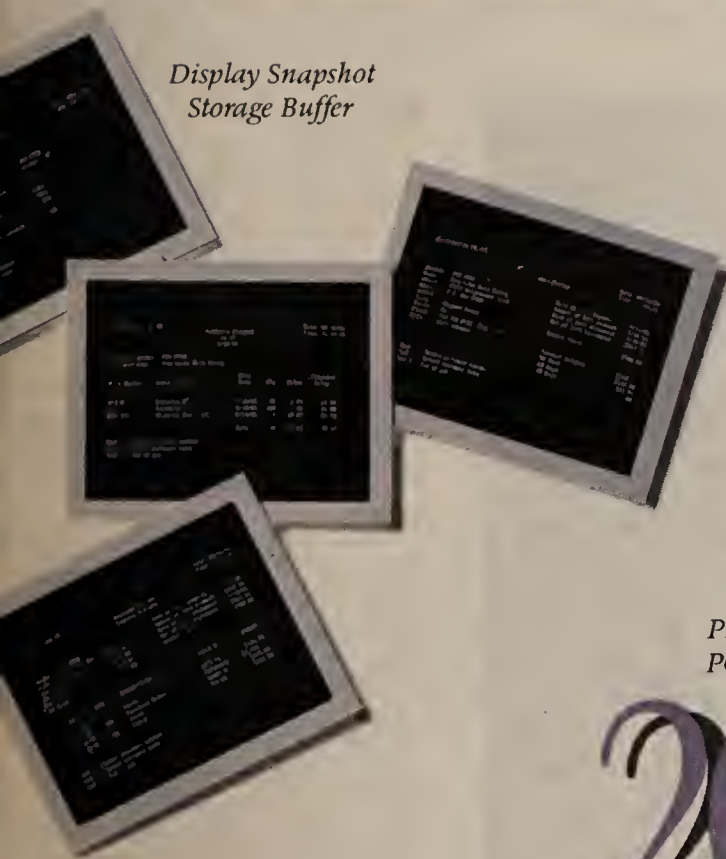
User Definable
Keyboard Mapping



Displayable Keyboard Map
of Program Control Keys



Display Snapshot
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Proven In More Than 20,000 Direct And Remote
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20,000

Even More Features

AST-5251/11 Plus or AST-5251/11

- Plugs into PC/XT/AT and compatibles; connects to System 34/36/38 via twinax cable and supports cable thru
- Emulates 5251-11, 5291 or 5292-1 display terminal
- Upgrade Kit for AST-5251/11 to AST-5251/11 Plus
- Selectable DMA and I/O interrupt channels
- Applications Program Interface (API) included
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- Hot-Key assist for concurrent PC and multiple host sessions
- IBM FSU compatibility (for virtual disk support on the System 34/36/38)
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- Complete package includes hardware, software, twinax cable assembly & user manuals

AST-5250/Display

- Used with AST-5251/11 brings full IBM 5251 Model 11 character and text display attributes to your IBM monochrome display
- Provides standard IBM PC &

IBM 5251 Model 11 monochrome display capabilities & a parallel printer port

- Hercules compatible high res bit mapped graphics interface
- Automatically switches from 5251/11 display to PC display mode without operator interaction

AST-5250/Display-C

- Used with AST-5251/11 brings IBM 5292 Model 1 display attributes to your PC's color display
- Provides compatibility with IBM PC Color Graphics Adaptor with full-spectrum color capabilities
- Includes parallel port
- Automatically switches from 5292 Model 1 display to PC display mode without operator interaction

AST-5251/12

- A total solution for remote PC/XT/AT/Portable or compatible to System 34/36/38 communications in SNA environments
- PC emulation for IBM 5251 Model 12 terminal
- Host-addressable 5256 printer support on PC-attached printer
- Applications Program Interface (API) allows integration between host and PC applications
- Includes hardware, software and comprehensive user documentation

On AST-5251/11: Your PC to System 34/36/38

monochrome display look just like an IBM Model 11 display.

And it gives you high-resolution Hercules™ compatible bit-mapped graphics, high quality text and a parallel port.

Now PC 5251/11 emulation is even easier for you because you're working with a screen identical to IBM's. And you can take advantage of the graphics capabilities offered by today's software.

AST-5250/Display-C™—IBM 5292 Color Attributes and Standard IBM PC Color Graphics Too. Use this card with your AST-5251/11 and your IBM color monitor for all of IBM's 5292 screen text attributes. And

some really colorful PC graphics.

Our color capabilities are completely compatible with your PC software favorites like Framework™, Symphony™, Lotus 1-2-3®, Business Graphics Systems™ and DESQview™. There's also a parallel port to make printer and plotter connection easy and convenient.

AST-5251/12™—Remote PC to 34/36/38 Connections. For remote communications in SNA/SDLC environments, this complete hardware/software package lets you use your PC as a remote 5251 Model 12 terminal, and your attached PC printer is host-addressable to emulate a 5256 printer. Our Applications Program Interface also makes

integrating host and PC applications easy.

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 74
the vendor said.

The vendor said that the software runs on IBM Personal Computers and compatibles using Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher.

The software costs \$500 and can be installed on up to 50 computers within an organization, according to Melrose Software.

Melrose Software, P.O. Box 3295, Milford, Conn. 06460.

The Torrington Co. has introduced **Keyfree** and **Telepaint**, software packages for its Manager Mouse.

Keyfree replaces keyboard commands with mouse movements. It was designed for use with products such as Lotus Development Corp. 1-2-3 and Symphony and Ashton-Tate's Dbase III. Keyfree allows users to customize mouse keys and motion to individual specifications at any time while a program is running. Telepaint with Man-

ager Mouse was designed to allow users to make overhead transparencies.

Keyfree with Manager Mouse costs \$218. Telepaint with Manager Mouse costs \$220.

Torrington, 59 Field St., Torrington, Conn. 06790.

Software enhancements

Nantucket, Inc. has released the **Winter '85** version of its **Clipper** compiler for Ashton-Tate's Dbase III and

Dbase III Plus.

According to the vendor, Winter '85 Clipper contains the commands JOIN, UPDATE, TOTAL SORT, SET PATH TO, MENU COMMAND and ARRAYS. A completely rewritten manual is included with the new version.

Winter '85 Clipper costs \$695.

It is available at no cost to registered Clipper users.

Nantucket, 5995 Sepulveda Blvd., Culver City, Calif. 90230.

Personal Bibliographic Software, Inc. has enhanced its professional bibliographic system **Pro-Cite**.

Pro-Cite was designed for the storage and retrieval of bibliographic records on the IBM family of Personal Computers. New features include sorting on all fields, customized bibliographic formats through a menu-driven user interface, automatic deletion of duplicate records and the ability to scan a document for in-text references and produce a bibliography automatically from all collected references.

Pro-Cite is priced at \$395.

Personal Bibliographic Software, P.O. Box 4250, Ann Arbor, Mich. 48106.

Soft Gold, Inc. has added routines specific to IBM's Topview software to its application programming language.

The routines are said to provide the programmer with access to all of Topview's Window Manager routines.

The Soft Gold products are priced from \$195 for runtime units, \$395 for complete interpreter with documentation and utilities and \$995 for the native-code compiler.

Soft Gold, Suite 204, 2082 S.E. Bristol, Santa Ana, Calif. 92707.

Conceptual Software, Inc. has enhanced its **Prodas** professional data base analysis system for IBM Personal Computers.

Prodas Version 3 was designed to emulate the SAS Institute, Inc.'s SAS data base manager. It also offers a full screen data entry and multi-keyed data bases.

Both the Prodas statistics package and the Prodas graphics package have also been enhanced.

The data base management package costs \$720. The statistical package costs \$420, and the graphics package costs \$365.

Conceptual Software, P.O. Box 56627, Houston, Texas 77256.

Softstyle, Inc. has announced a new version of its **Colormate** software that is said to allow color painting on the Apple Computer, Inc. Macintosh and printing in eight colors on Apple's Imagewriter II.

Macintosh users can import black-and-white pictures or text created by Apple Macpaint, Macdraw, Macwrite and other programs and then color them and print them in color.

Colormate is priced at \$95.

Softstyle, Box 598, 606 Fifth Ave., East Northport, N.Y. 11731.

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NEW PRODUCTS/COMMUNICATIONS

COMMUNICATIONS

Controllers

Adacom Corp. has introduced **Adalink**, a transmission device said to provide remote attachment of IBM 3270 Type A coaxial terminals to local or remote controllers over dial or leased-line connections.

Adalink consists of two stand-alone units, the CP-100L Controller Adapter and the CP-101L Terminal Adapter. Adalink allows the option of synchronous communications at rates up to 96.K bit/sec. or asynchronous up to 19.2K bit/sec. It features built-in error detection and correction and password security.

The CP-100L and CP-101L cost \$890 and \$760, respectively.

Adacom, 8871 Bond St., Overland Park, Kan. 66214.

Bridge Communications, Inc. has introduced the **Integrated VAX Ethernet Communications Server (IVECS)**.

IVECS connects a Digital Equipment Corp. VAX mini to an Ethernet local-area net. It plugs into a single VAX hex-size Unibus slot and emulates up to eight DMF 32 I/O controller cards. It permits connections for up to 64 devices attached to the local net through Bridge servers or, in the case of IBM Personal Computers, by Bridge's Etherterm software.

IVECS is priced at \$6,900 plus an annual software license fee of \$250.

Bridge Communications, 2081 Stierlin Road, Mountain View, Calif. 94043.

Bridge Communications, Inc. has introduced the **CS/200** Ethernet communications server.

The server connects four or 10 asynchronous devices to a Bridge Ethernet local-area network running the Xerox Corp. Xerox Network System protocols. It allows system throughput of 192K bit/sec. with all 10 ports able to operate simultaneously at 19.2K bit/sec.

The CS/200 costs \$3,250 with 10 ports and \$2,600 with four ports.

Bridge Communications, 2081 Stierlin Road, Mountain View, Calif. 94043.

Timeplex, Inc. has introduced the **Timeplex T-1 Channel Service Unit (T-CSU)** an interface between the Link/1 Facilities Management System and the high-speed digital transmission facility.

It supports functions such as termination of the high-speed digital link — T1 line — on the user's premise in accordance with AT&T Technical Reference 62411, ensures that the transmission to the T1 network complies with Federal Communications Commission rules and provides for loop-back testing.

The Timeplex T-CSU costs \$2,495.

Timeplex, 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

Voice/data communications

Centigram Corp. has upgraded its **Voicememo** family of voice messaging systems to support up to 2,000 users and to operate on 48V dc power.

Voicememo combines office telephone systems with computers that are said to convert the voice signals transmitted over the telephone lines to digital form that can be stored and retrieved from computer memory with no degradation in the quality of tone. Messages stored in the system are password protected.

A four-port system capable of storing five hours of messages costs \$29,995. A 14-port system capable of storing up to 30 hours of incoming messages costs \$79,995.

Centigram, 1883 Ringwood Ave., San Jose, Calif. 95131.

Argo Communications Corp. has announced a WATS offering, **Omni**, that reportedly saves users between 10% and 15% over AT&T's service.

Targeted to businesses that spend more than \$3,000/mo on long-distance calls, Omni offers virtual banding, dynamic least-cost routing and telemanagement reports. Users save on long-distance charges without requiring call screening or programming of telephone equipment.

The monthly charge for Omni ranges from \$70 to \$125 per circuit, depending on the location.

Argo Communications, 145 Huguenot St., New Rochelle, N.Y. 10801.

Protocol converters

Telenex Corp. has announced its cable converter unit, **CCU-232**, part of the Autonex family of cable management and network control products.

The CCU-232 is said to multiplex all RS-232 signals, transmitting them

over four-wire cable at speeds up to 19.2K bit/sec. Equipment can be spaced up to 1,000 feet apart.

Other features include the ability to transmit all primary and secondary signals, the ability to plug directly into equipment or modems and LED indicators to show signal path activity.

CCU-232 is priced from \$70.

Telenex, 502 Pleasant Valley Ave., Moorestown, N.J. 08057.

Software

Recognition Equipment, Inc. has introduced **Redi**, a software package for its GEN-V system designed to automate the transmission of data from a variety of portable hand-held terminals.

The software consists of an intelligent interface. **Continued on page 81**

HoneyBunch.
Honeywell VIP synchronous emulation and file transfer (FTF included).
Compatible with Tapview and IBM PC Local Network.
Honeywell VIP asynchronous emulation and file transfer.
Compatible with Tapview and IBM PC Local Network.
WriteMate option to download into Personal Assistant (PFS) file formats: 49 \$.

Honeywell and VIP are trademarks of Honeywell Corp.
IBM PC and Tapview are trademarks of International Business Machines Corp.
PFS is a trademark of Software Arts.

TDT
TDT Inc., Rivergate Plaza, 444 Brickell Ave. Miami FLA 33131.
Tel. (305) 372.93.32

Connections IBM PC – Honeywell mainframe

60 DAY MONEY BACK GUARANTEE
Yes, send me immediately

Quantity _____

HoneyBunch synchronous emulation and file transfer 499 \$ _____

HoneyBunch asynchronous emulation and file transfer 299 \$ _____

WriteMate option 49 \$ _____

Subtotal _____

State Tax _____

Amount enclosed _____

Payment ☐ VISA ☐ MC ☐ BankDraft ☐ Check _____

Credit card Exp. Date _____

Card No. _____

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NEW PRODUCTS/COMMUNICATIONS

Continued from page 79

gent interface that is said to fully automate data collection procedures such as scheduling, dialing the telephone, establishing contact with the remote device, receiving data, logging transmission statistics and handling error and retry conditions. Redi costs \$4,850 per system. Recognition Equipment, P.O. Box 660204, Dallas, Texas 75266.

Communications Research Group released **Blast** for AT&T's Unix PC, communications software said to connect the Unix PC with 120 computers under 25 operating systems. The product allows the Unix PC to transfer files to and from any other computer running Blast software. Features include full-duplex asynchronous file transfer; no add-on boards or interface hardware; standard RS-232 serial ports; support of any asynchronous modem at any speed; and full file transfer, text upload and download, terminal emulation and electronic mail. Blast for the Unix PC costs \$295. Communications Research Group, 8939 Jefferson Highway, Baton Rouge, La. 70809.

SYSTEMS & PERIPHERALS

Processors

Silicon Solutions has announced the **Mach 100 Simulation Engine**, a hardware accelerator said to simulate integrated circuits and printed-circuit boards. It is designed to perform high-speed logic and fault simulation of electronic designs at the gate and switch levels. It reportedly operates at a speed of 250,000 events per second and has the capacity for 32,000 four-input modeling elements. The engine is integrated into the design environment either as a dedicated hardware accelerator serving a single workstation or as a shared peripheral accessible over a local-area network through a host workstation. The Mach 100 costs \$25,000 for logic simulation and \$30,000 for logic and fault simulation. Silicon Solutions, 1380 Willow Road, Menlo Park, Calif. 94025.

Numerix Corp. has announced the **NMX-432/BI**, the first in a series of array processors designed to interface with the Digital Equipment Corp. VAXBI systems bus. The NMX-432/BI is a 32-bit array processor with computational speeds of 30 million floating-point operations per second. Data transfer speeds to and from the VAXBI systems bus will be three to five times faster than on models that interface to the Unibus VAX systems. The price of the NMX-432/BI starts at \$106,460, including BI interface and Fortran compiler. It will be available in the third quarter. Numerix, 20 Ossipee Road, Newton, Mass. 02164.

CAD/CAM/CAE

Calcomp, Inc. has added the **300 series Interactive Design Station** to its System 25 computer-aided design system.

The workstation does not include the picture processor, which is standard in the 600 series configuration. On the 300 series station, graphics and text are handled on one screen, with pop-up menus to display text and command options. A basic 300 series configuration includes a CPU with 2M bytes of memory, floppy disk drive, a 19-in. color screen that displays 16 of 4,096 possible colors, a mouse and a keyboard. The basic system costs \$60,500. Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Data storage

Calcomp, Inc. has announced a **474M-byte disk drive** option for its System 25 interactive computer-aided design system.

According to a company spokesman, the disk drive option provides data transfer rates of 1.859M bit/sec. and an average access time of 18 msec. The 474M-byte disk drive subsystem costs \$35,900 for the first drive and \$31,000 for additional drives. Calcomp, 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Mesa Technology Corp. has announced its **6200T** series of Tempest disk subsystems. The 6200T series is Intel Corp. Multibus-based. Various configurations are available including 344M-byte Winchester disks, 26M-byte fixed or front-removable storage module drive disks and 1M-byte floppy disks. All subsystems are pack-

aged in Tempest enclosures. Other configurations and interfaces, including ST506 and SA4000, are available. The 6200T series subsystems are compatible with Microsoft Corp. Xenix and Intel Irmx operating systems. Subsystems pricing starts at \$38,000. Mesa, 16021 Industrial Drive, Gaithersburg, Md. 20877.

Clearpoint, Inc. has introduced the **VMERAM/4MB** 4M-byte memory and the **VMERAM/2MB** 2M-byte memory for the VMEbus. The VMERAM memories use a custom Clearpoint chip set and zigzag in-line package dynamic random-access memories to achieve a 4M-byte ca-

Continued on page 84



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The Tandy 3000 is designed to use the forthcoming XENIX 5.0 multiuser operating system. Two to six people can use the 3000 simultaneously with low-cost data terminals. The Tandy 3000 is network ready, too. The Tandy 3000 (25-4001, \$2599) operates at twice the speed of the industry standard, has 512K of main memory (expandable to 640K on the main board), a high-capacity floppy disk drive and a serial/parallel adapter. Expands easily with ten expansion slots, too.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 81

capacity without daughter cards or cabling. A 64-bit-wide word is used for error correction, according to Clearpoint.

The VMERAM is said to allow 16-, 24- or 32-bit addressing and 8-, 16- or 32-bit word length.

The VMERAM/4MB costs \$3,825, and the VMERAM/2MB costs \$2,550, the vendor said.

Clearpoint, 99 South St., Hopkinton, Mass. 01748.

Terminals

Pericom, Inc. has announced MX-4000, the first product in a family of color graphics terminals.

The MX-4000 uses the Hitachi Ltd. HD63484 advanced CRT controller. It also uses the 16-bit Motorola, Inc. 68000 microprocessor for graphics and the 8-bit Motorola 6809 for text processing. It is software compatible with Tektronix, Inc.'s 4107, 4010 and 4014 in

graphics mode and Digital Equipment Corp.'s VT20 and VT100 in alphanumeric mode.

The MX-4000 color graphics terminal costs \$4,995.

Pericom, 51 Digital Drive, Novato, Calif. 94947.

Printers/plotters

CIE Terminals, Inc. has added the Lips 10 nonimpact printer to its printer product line.

The Lips 10 is a 10 page/min laser printer said to have a life cycle of more than 600,000 pages. It offers 300 by 300 dot/in. resolution and is compatible with the Epson America, Inc. FX-80 and the Diablo Systems, Inc. 630 daisywheel printers.

The Lips 10 laser printer costs \$3,495.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

Houston Instruments Co. has added the E-size DMP-56 to its family of professional drafting plotters.

The plotter accommodates 18 different media sizes ranging from 8½- by 11-in. to 36- by 48-in. It can produce standard, metric, oversized and architectural C-, D- and E-size drawings.

Features include a resolution of 0.001 in. and a maximum plotting speed of 17 in/sec. The plotter can be interfaced to any computer with a standard RS-232C-compatible port.

The DMP-56 costs \$5,995.

Houston Instruments, 8500 Cameron Road, Austin, Texas 78753.

PRICE REDUCTIONS

O'Neill Software is issuing site licenses for its text retrieval program, Electra-Find.

The site license permits an organization to make an unlimited number of copies of the program for use at one location and permits members of the organization to make copies for personal use.

Electra-Find runs on the IBM Personal Computer line and compatibles. The site license costs \$299. Individual copies cost \$49.

O'Neill Software, Suite 1822, 440 Davis Court, San Francisco, Calif. 94111.

Plus Development Corp. has reduced the price of its Hardcard.

Hardcard is a 10M-byte hard disk drive on a card for the IBM Personal Computer and compatibles.

The price has been reduced to \$895 from \$1,095.

Plus Development, 1778 McCarthy Blvd., Milpitas, Calif. 95035.

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AT&T's line of personal computers starts with the AT&T PC 6300. It gives you access to an entire range of popular MS-DOS applications, and you can upgrade to the AT&T PC 6300 PLUS as your needs grow.

The AT&T PC 6300 PLUS gives you greater power and speed to access even more information faster. And with the option of running UNIXTM System V in addition to MS-DOS applications, you get the advantages of true multi-tasking capabilities.

Likewise, the AT&T UNIX PC product line bridges the gap between UNIX System V and DOS applications with a new DOS-73[™] Coprocessor. The Model 7300 can be upgraded to a UNIX PC Model 3B1 with all the power, memory and storage you need to handle the demands of up to five simultaneous users.

When you need to step up to departmental power, look to our 3B Computer line. These powerful machines communicate among themselves, other



start, AT&T's full line of computer products a smooth growth path to the future.

UNIX System V-based machines, as well as MS-DOS PCs and mainframes supporting 3270 protocols.

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AT&T offers a broad line of both asynchronous and synchronous data products designed to work with what you already have and with what you may eventually want.

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When it comes to terminals, AT&T's line stretches all the way up to the modular, 3270-compatible AT&T 6500 Multifunction Communication System. With its windowing capabilities, this system will simultaneously connect to multiple syn-

chronous and asyn-

chronous hosts.

The final link in the information chain is data communications equipment, and AT&T has it all. From

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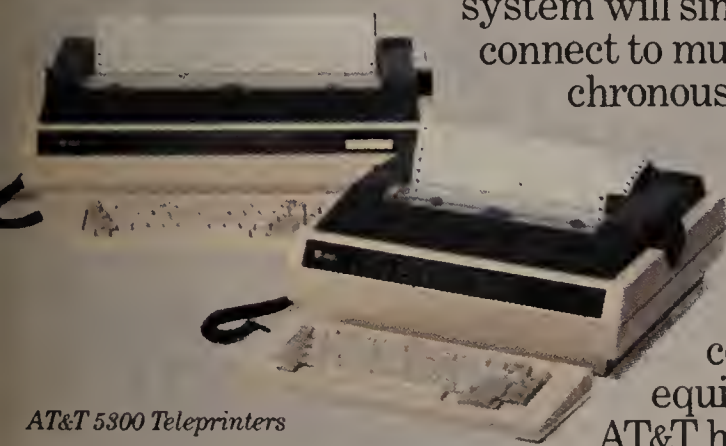
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NEWS



CALENDAR

WEEK OF MARCH 2

MARCH 3-4, SYRACUSE, N.Y. — **End-User Computing: Managing Information Centers.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 3-7, CALGARY, ALTA. — **Advanced Systems Analysis.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 17-21 in Pittsburgh.

MARCH 3-7, DENVER — **Sixth Annual Alpha Micro Users Society Convention.** Contact: Sharon Greene, Alpha Micro Users Society, 735 Walnut St., Boulder, Colo. 80302.

MARCH 3-7, SCOTTSDALE, ARIZ. — **1986 Conference on EDP Performance Management.** Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

MARCH 4-6, PARIS — **Securicom '86 — Fourth Worldwide Congress on Communications Security and Protection.** Contact: Securicom-SE-DEP, 8 Rue de la Michodiere, 75002 Paris, France.

MARCH 4-7, ORLANDO, FLA. — **Personal Financial Services.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

MARCH 5-7, SCOTTSDALE, ARIZ. — **Society for Information Management Institutional Member Conference.** Contact: Society for Information Management, 111 E. Wacker Drive, Chicago, Ill. 60601.

WEEK OF MARCH 9

MARCH 9-12, SAN DIEGO — **Fourth Annual Computer-Based Training Conference & Exposition.** Contact: Val Adell, Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

MARCH 10-11, CLEVELAND — **DBMS Software: Functions — Package Comparison.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 13-14 in Detroit.

MARCH 10-12, DES MOINES, IOWA — **Systems Project Management.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 31-April 2 in Toronto.

MARCH 10-12, CINCINNATI — **Effective Systems Analysis and Design: Tools and Techniques.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 10-12 in Toronto.

MARCH 10-14, DALLAS — **Second International Integrated Services Digital Networks Exposition.** Contact: Danae Fasano, Conference Coordinator, Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

MARCH 12-14, DETROIT — **Artificial Intelligence for the Automotive Industry — The Demystification.** Contact: Dale Mason, Technical Activities Department, Society of Manufacturing Engineers, Computer and Automated Systems Association of SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

WEEK OF MARCH 16

MARCH 17, BOSTON — **Establishing the Executive Workstation.** Contact: Diane Rodgers, DMR Associates, Inc., 57 River St., Wellesley Hills, Mass. 02181.

MARCH 17-21, BALTIMORE — **Basic Systems Analysis.** Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road,

Cleveland, Ohio 44138.

MARCH 17-21, MILWAUKEE — **Test Data Acquisition and Processing for Instrumentation Applications.** Contact: John T. Snedeker, Program Director, Center for Continuing Engineering Education, University of Wisconsin at Milwaukee, 929 N. Sixth St., Milwaukee, Wis. 53203.

MARCH 18-21, LAS VEGAS — **Check Processing.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

MARCH 19-21, LAS VEGAS — **CDLA Spring Meeting.** Contact: Dianne L. Sims, Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

MARCH 19-21, BLACKSBURG,

VA. — **Personal Computer Interfacing for Scientific Instrument Automation.** Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

WEEK OF MARCH 23

MARCH 24-26, CHICAGO — **Systems 1 Conference and Exposition.** Contact: Michael A. Tew, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

MARCH 24-27, SINGAPORE — **Artificial Intelligence '86 Conference: AI and its Applications — A State of the Arts Review.** Contact: John Tagler, Elsevier Science Publishers, 52 Vanderbilt Ave., New York, N.Y. 10017.

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COMPUTER INDUSTRY

Lotus acquires software publishing firms

CAMBRIDGE, Mass. — Lotus Development Corp. last week finalized agreements to acquire both Isys Corp., of Acton, Mass., and GNP Development Corp. of Pasadena, Calif.

Lotus announced its intent to acquire the two software publishers in December 1985.

From its merger with GNP, Lotus will acquire the Human Access Language (HAL) program, which is one that allows users of Lotus' 1-2-3 spreadsheet package to execute commands using English language phrases.

GNP officers Bill Gross and Larry Gross will reportedly serve as consultants to the Lotus Business Products Division, which produces the 1-2-3

package and other Lotus software offerings.

HAL is still in development and will be released later this year, Lotus said.

Computer Industry section begins on page 114.

Isys produces financial information systems that consist of financial analysis software and on-line user access to a financial data base.

Isys products, which are currently sold to professional investors, have been said to be ideal for use in connection with Lotus' Signal, a modem

and software product that allows users to receive real-time stock market quotations over an unused portion of the FM radio band.

Lotus acquired Signal as a result of its 1985 acquisition of Dataspeed, Inc., which marketed Signal as the Modio.

"We are eager to begin some integration between Isys and Signal as well as with other Lotus products," said Donald L. McLagan, vice-president of Lotus' Information Services Division.

McLagan said Isys founder and President Larry Moore will be hired by the Information Services Division, which markets Signal.

—Edward Warner

AT&T reaches out for profits

From page 114

expectations — both Wall Street's and the company's. And its sluggish computer sales are a major reason why.

The year 1985 was admittedly a tough one in which to build a successful post divestiture strategy on sales of computer hardware. But AT&T does not have the luxury of a Wang Laboratories, Inc., Data General Corp. or IBM in blaming a below-average year on the computer industry slump.

Unlike its competitors in better years, AT&T has not yet convincingly proven that it can sell enough computers in order to turn a handsome profit.

Merger/acquisition rumors again?

If AT&T's quarterly results in 1986 continue to bear that out, the merger/acquisition rumors will be unleashed once again. But before the Wall Street odds makers come out in force to take bets on which computer vendor will be the chosen one, it is worth noting that AT&T's challenge requires more soul searching than a trip to the computer companies' shopping mall.

The fundamental question is: Just what kind of a computer company does AT&T want to be? Fault-tolerant? Micro? Multiuser/mini/super-mini? Unix-based OEM? AT&T made some major deals in all of these areas in 1985, but what is the overall master plan?

Despite AT&T's size and resources, it seems the computer industry only has room for one all-things-to-all-people vendor, and even the one with an 80%-plus share of installed mainframes and a \$4 billion R&D budget had a tough year.

AT&T's industry position is curiously analogous to the software position of its brainchild Unix: The commercial MIS market appears confused about just what its direction and focus is going to be. If AT&T actually were to acquire a multi-billion dollar systems vendor, that confusion would only get worse.

You won't read the early Las Vegas betting line here, but the advice is that AT&T should take a hard look at smaller companies with proven track records in specific markets, whether vertical or technical. The rumormongers' predicting that AT&T will set the industry on its ear with a General Electric Co./RCA Corp.-type megadeal may yet be proven right, but it's doubtful. Such a move makes little sense at this point for a \$35 billion giant still struggling to find an identity in the wilds of the computer industry.

■
In the how-soon-they-(try-to)-forget department: Ex-Apple Computer, Inc. Chairman Steve Jobs recently led an employee buy-out of Pixar, the computer graphics division of the film company owned by George Lucas of *Star Wars* fame. But more interesting than the purchase was Pixar's identification of Jobs in their press release: "A young industrialist and founder and president of Next, Inc., a Silicon Valley start-up which will make powerful computers for the higher education market." Born again or just amnesia?



COMPUTER INDUSTRY

Sequent wins market bet

From page 114

in parallel processing, particularly within high-volume transaction processing applications, Sequent is slowly positioning its machine as a multiprocessor that provides future parallel processing capabilities, making it a two-in-one-type product. "We call it our breath-mint, candy-mint approach," Gibson said.

Some formidable competitors

That approach pits Sequent against some formidable competitors, such as Digital Equipment Corp. Sequent claims that the performance of its Balance 8000 is four times that of DEC's VAX 8600 machine for half the price. On its lower end, Sequent competes with smaller entries such as Pyramid Technology Corp., which provides a machine with up

to two processors.

Young firms like Sequent need a high price/performance ratio. "Small companies need three or four times the price performance in order to catch anyone's attention," said product marketing manager Rick Gimbel.

From the looks of its offices, Sequent is hoping to catch lots of attention. Last summer, the firm moved to a new 86,000-sq-ft building in Beaverton. Today, about one-third of that space is re-

served for future growth.

Although backed by a group of dedicated investors, most of whom have participated in three rounds of financing totaling more than \$22 million, Sequent's chances for survival depend on its ability to recruit some major OEMs. Specifically, the company hopes to sign up technical OEMs that want fast processing capabilities for a single application.

One of the company's biggest OEM contracts to date is

a \$10 million, 3-year contract with test equipment manufacturer Teradyne, Inc.

Some analysts said they believe that if companies like Sequent are to make a mark in the computer marketplace, they cannot limit themselves to scientific applications.

'Missing the boat'

"Companies that limit parallel processing applications to scientific and technical markets are missing the boat," said Omri Serlin of

Itom International Co., a Los Altos, Calif., consultancy.

"There are many opportunities for parallel processing technology, particularly in high-volume transaction processing," Serlin added. Gibson admitted that Sequent is "flirting" with the commercial market.

With the addition of some more OEM contracts, observers paint a bright future for Sequent. "They are a company that is here to stay," Serlin said.

Eagle signs agreement with KE&C

By Maura McEnaney

GARDEN GROVE, Calif. — In what may be a last-ditch effort to stay afloat, microcomputer manufacturer Eagle Computer, Inc. announced a manufacturing and distribution agreement with KE&C America Corp., giving the U.S. subsidiary of the South Korean firm the rights to manufacture and sell Eagle products.

The agreement covers the Eagle Turbo, Spirit, PC Plus and 1600 product lines, and it replaces an earlier agreement between Eagle and the South Korean manufacturer that relinquished voting control of Eagle stock to KE&C.

Separately, Eagle reported a \$2.4 million loss, or 11 cents per share, on sales of \$1.5 million for the second quarter ended Dec. 28. In the like quarter a year earlier, Eagle lost \$1.8 million, or 12 cents per share, on \$5.8 million in revenue. But excluding a single \$4.1 million sale in the year-earlier period, sales remained flat.

Eagle President and Chief Executive Officer Gary Kappenman said the firm does not expect to be profitable until it obtains outside financing to put its Concorde multiuser supermicro on the market. The Concorde is not included in the KE&C agreement.

Late last month, Eagle laid off virtually all of its 50-member staff, rehiring approximately 26 to work on a week-to-week basis.

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The Smart Desk from IBM

Prime Computer attributes record year to international sales

By Edward Warner
Computerworld News Service

NATICK, Mass. — International sales have saved the day for Prime Computer, Inc. While competitors such as Data General Corp. took a beating in 1985 — largely because of a downturn in the U.S. market — Prime reported a 20% increase in revenue, with a full half of its 1985

product revenue coming from overseas customers.

International sales have provided Prime with a buffer against hard times in the U.S. market and have also prompted the company to explore design techniques not widely used in the U.S., such as ergonomics, said Richard Williams, vice-president of international marketing.

Prime ventured into international marketing one year after its founding in 1972. Its early pursuit of foreign sales made Prime stand out among its competitors, Williams said.

That gamble has since paid off. Growth at most of Prime's 12 foreign subsidiaries currently outpaces the growth of the U.S. mar-

ket. Its European subsidiaries are showing average annual growth of 45%, or five times the estimated 1986 growth of the U.S. computer industry. Prime's West German subsidiary is growing at an annual rate of 50% to 60%, Williams said.

Williams said he believes Prime met success in the international sector because its

first customers were engineers and scientists, a market considered the least sensitive to international differences. Williams said the reputation of Prime's first minicomputer, the 16-bit Prime 200, spread across national borders much faster than it would have if the machine had been targeted to the business user.

In Europe, the Prime sales force still sells largely to engineering and scientific users. Only in France are most Prime machines sold for use in commercial applications, even though Prime broadened its worldwide product focus to include business applications as far back as 1981.

Prime soon found itself opening foreign subsidiaries at the rate of one or two a year. It now has offices covering Australia, Benelux, Canada, France, Hong Kong, Italy, Japan, Scandinavia, Singapore, Switzerland, the U.K. and West Germany.

Prime's subsidiaries have great independence: they set their own prices, hire their own employees and are almost always managed by citizens of the countries in which they are located. But when it comes to the company's product line, the U.S.-based parent holds tight reins on its subsidiaries.

No custom tailoring

Permit a subsidiary to tailor a Prime software package to meet customer needs? Williams shuddered at the thought. "I'm very concerned about subsidiaries modifying software, particularly if we are to be able to support that software," he observed. "To do otherwise would be to begin to dilute your product offering and put your operating system at risk."

Prime, however, is showing signs of flexibility in its once absolute support for IBM's Systems Network Architecture (SNA) for inter-computer communications. Last month the company joined the Corporation for Open Systems, a group of about 20 U.S. computer manufacturers that are seeking to make the Open Systems Interconnect (OSI) model an alternative to SNA. OSI is more popular in Europe than in the U.S., and Prime's action may be as much a response to foreign sales pressures as it is a blow for SNA independence.

Prime has stabilized in the international arena, as is evidenced by its intention to open no additional subsidiaries until 1990. But success is a heady tonic, and Williams quickly added that the strategy could change "if we find the market potential of such areas as Africa and the Far East proves too tempting to resist."

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What you see here are some of the many, many words it would take to describe what's on the computer's screen. And even these aren't enough. Here's what we mean. Sales began on week 12 with one unit sold. During week 13, four units were sold. Week 14, 18 units sold. Week 15, 20 units sold. Week 16, 48 units sold. Week 17, 42 units sold. Week 18, 46 units sold. Week 19, 60 units sold. Week 20, 125 units sold. Week 21, 120 units sold. Week 22, 146 units sold. Week 23, 132 units sold. Week 24, 149 units sold. And week 25, 148 units sold. By the end of week 15, an upward trend was indicated. In order to boost sales performance a three-day promotion was run, beginning at week 16. This promotion resulted in actually lower sales figures, as they declined from 48 at week 16 to 42 at week 17, and rising slightly to 46 at the end of week 18. Following this period, another upward trend began with volumes up to about 125 in the next two weeks. However, from that point on sales became erratic. A study of sales performance during the last five weeks of this period indicates an approximate 27 unit-per-month increase to date. However, the erratic behavior of product sales (week 20: 125 units sold, week 21: 120 units sold, week 22: 146 units sold, week 23: 132, week 24: 141, and week 25: 148), coupled with the fact that volumes never hit the 150 unit sales point would indicate a leveling off of demand. Compared to expected normal sales ranges, a standard pattern was followed with at no point there being any exceptionally good indications. On the contrary, during weeks 18 and 19, it was about minus five to minus ten against the worst-case of 53 and 76 respectively. With the exception of the promotional period—during which greater sales were achieved, that is sales that exceeded the normal sales range—sales were consistently toward the lower-end side. Even though sales did not exceed normal sales upper limits, they were favorable from a competitive-position perspective. After the initial phase where sales were one, four and 18 for the first three weeks, against three, six and 11 for the competition, we were above the competitive levels consistently. It should also be noted that as our sales began to flatten, so did the competition. In week 16, our sales were at 48 units, while the competitive product was at 18 units. In week 17, we were at 42, while the competitor was at 28. In week 18, we were at 46, they were at 42. In week 19, we were at 60, while they were at 58. During week 20, we were at 125, they were at 74. In week 21, we sold 120 units, they sold 87. Week 22, we sold 146, they sold 94. Week 23, we experienced a decline in sales to approximately 132 units. Our competitor, on the other hand, was at 97 units. In week 24, we were at 149, and they were at 96. In the 25th week, the final week of tracking sales, our sales were at 148, while our competitor's were at 95.

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COMPUTER INDUSTRY

IBM reshuffles executives in division management

ARMONK, N.Y. — IBM last week announced three executive changes, including the naming of Satellite Business Systems (SBS) President and Chief Executive Officer Marvin L. Mann as president of the Information Products Division.

Mann will continue to serve as head of SBS until its merger with MCI Communications Corp. is completed. Under the landmark agreement announced in 1985, MCI will sell a 16% stake to IBM in exchange for the assets and operations of SBS, the long-distance telecommunications joint venture of IBM and two other firms.

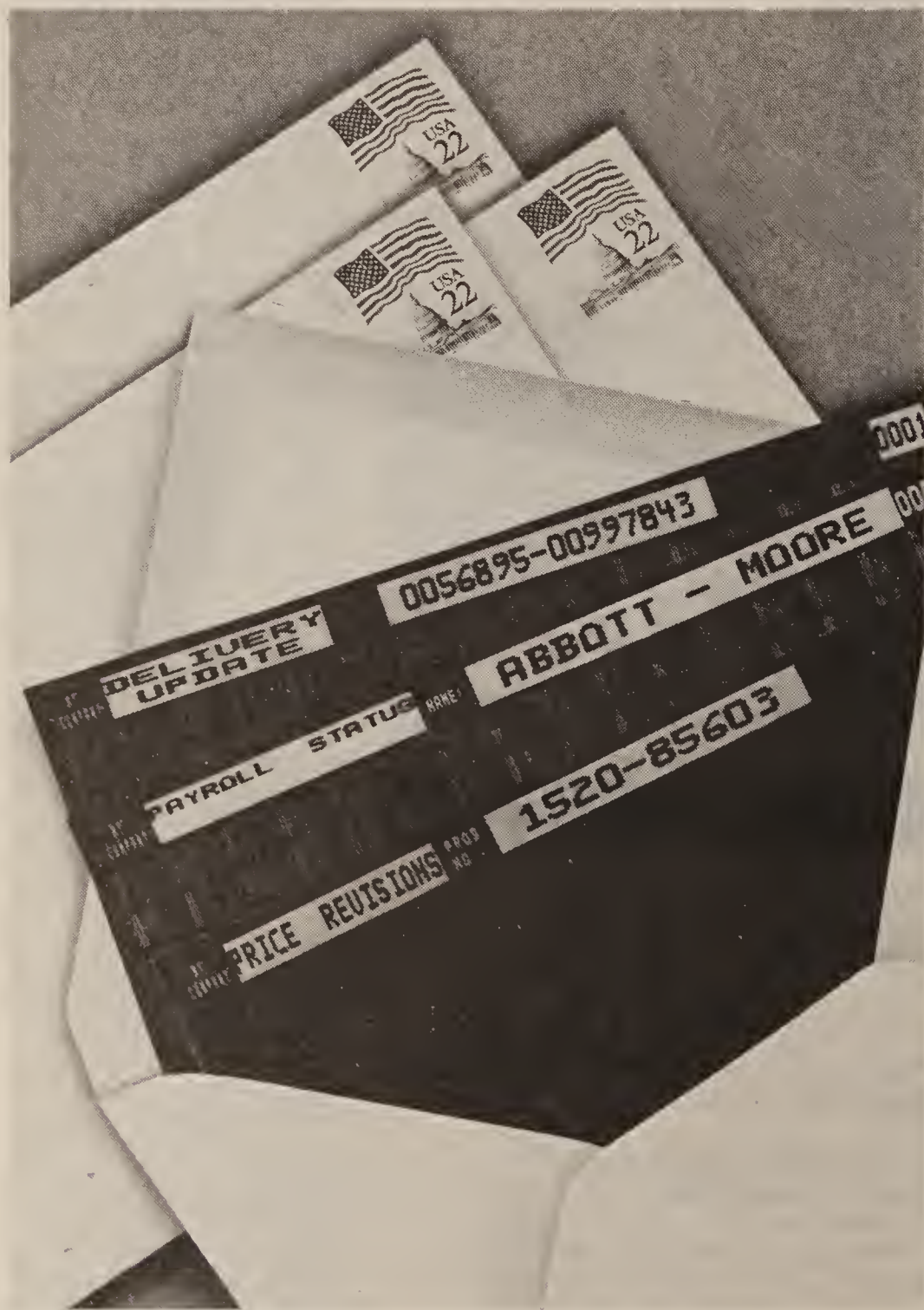
Information Products is responsible for IBM's financial systems, copiers, typewriters, printers, supplies and related software.

Mann replaces Edward E. Lucente, an IBM vice-president who was appointed group executive of the Information Systems Group.

As Information Systems executive, Lucente replaces C. B. Rogers Jr., who was named head of corporate services staffs. Rogers will be responsible for corporate communications, personnel, management systems and organization.

— Clinton Wilder

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Disk drive maker reports deficit

SAN JOSE, Calif. — Disk drive manufacturer Xebec Corp. reported a first-quarter loss of \$1.86 million, or 14 cents per share, for the period ending Dec. 27. Earnings for the same period a year earlier were \$80,000, or 0.01 cents per share.

Revenue for the first quarter was \$28.3 million, compared with \$41.5 million a year ago. The figures include a \$1 million loss from operations at thin-film subsidiary Information Memories Corp. of Santa Clara, Calif., and composite-head manufacturer Dastek of Los Gatos, Calif.

The losses at Xebec have also caused the company to enter into a technical default on a loan agreement with the Bank of the West in San Jose. According to Chief Financial Officer Christian Hoebich, Xebec's losses exceeded limits stipulated in the loan agreement. Xebec has \$12.6 million cash on hand and an \$8 million loan outstanding, he said.

— Maura McEnaney

Exec departs as loss posted

From page 114

way." Gable's old position of vice-chairman and chief operating officer will be phased out, he said.

In mid-1985, Gable, who had been a director of the company, was brought in to run the day-to-day operations. With Gable in command, the company was reorganized into five operational divisions, all of which reported to him.

Only two small divisions were Berrett's responsibility before his exit, a spokesman said. The divisions are Cambridge Interactive Systems Ltd., the subsidiary of Computervision that makes Medusa computer-aided design and computer-aided manufacturing software, and PSO, the company's personal systems organization.

However, it was Berrett who instituted a number of changes, including the project to port Computervision's software to industry standard platforms, a spokesman for the company said.

COMPUTER INDUSTRY



Intecom, Inc. reported fourth-quarter profits of \$519,000, or 2 cents per share, on revenue of \$32.4 million; a year earlier, the company posted profits of \$4.4 million, or 14 cents per share, on revenue of \$42.4 million. For fiscal 1985, the company posted a loss of \$6.6 million, or 20 cents per share, compared with profits of \$11.7 million, or 37 cents per share, in 1984. Revenue was \$123.5 million in 1985, compared with \$131.7 million a year earlier.

VM Software, Inc. reported revenue for the fourth quarter ended Dec. 31 of \$6.4 million, compared with \$4 million in the like period the previous year. Profits were \$1.6 million, or 37 cents per share, compared with \$783,000, or 23 cents per share a year earlier.

The Ultimate Corp. announced revenue for the quarter ended Jan. 31 of \$38.2 million, compared with \$27.7 million in the previous year. Profits were \$4.1 million, or 48 cents per share, compared with \$2 million, or 20 cents per share, one year ago.

Bridge Communications, Inc. achieved record revenue in the fourth quarter ended Dec. 28. Revenue of \$9.7 million represents an increase of 106% over the comparable period in 1984 and 19% over third-quarter 1985. Fourth-quarter net income rose to \$1.2 million, or 14 cents per share, compared with net income of \$383,000, or 6 cents per share — including an extraordinary credit of \$176,000, or 3 cents per share, associated with the utilization of net operating loss carryforwards — in the fourth quarter of 1984.

Valid Logic Systems, Inc. reported revenue for the year of \$56.1 million, compared with \$48.3 million in the previous year. Profits for the year were \$1.8 million, or 13 cents per share — including 2 cents per share of extraordinary credit from utilization of tax loss carryforwards — compared with \$6.3 million, or 46 cents per share, including 1 cent per share of extraordinary credit from utilization of tax loss carryforwards in 1984.

Scientific Computers, Inc. reported revenue for the second quarter ended Dec. 31 of \$6.7 million, compared with \$7.1 million in the previous year. Profits for the quarter were \$42,308, or 4 cents per share, compared with \$190,614, or 15 cents per share, for the same period the previous year.

Automatix, Inc. reported a net loss of \$5.6 million, or 51 cents per share, on revenue of \$27.6 million for 1985. This result compares with a 1984 net loss of \$14.2 million, or \$1.31 per share, on revenue of \$20.1 million.

The company also reported a net loss of \$1.4 million, or 12 cents per share, on revenue of \$6.3 million for the fourth quarter of 1985. This compares with a net loss of \$4.7 million, or 43 cents per share, on revenue of \$7.8 million in the like period a year before.

Siliconix, Inc. announced revenue for the year ended Dec. 31 of \$108 million, compared with \$96.3 million in the previous year. Profits were \$9.1 million, or \$1.41 per share, compared with \$8.4 million, or \$1.29 per share, in the like period a year before.

Continental Telecom, Inc. reported revenue for the fourth quarter ended Dec. 31 of \$738 million, compared with \$647 million for the same quarter a year before. Profits were \$64 million, or 87 cents per share, compared with \$57 million, or 76 cents per share, in the previous year.

The company reported yearly revenue of \$2.6 billion, compared with \$2.4 billion for the previous year. Yearly profits were \$240 million, or \$3.21 per share, compared with \$195 million, or \$2.60 per share, in 1984.



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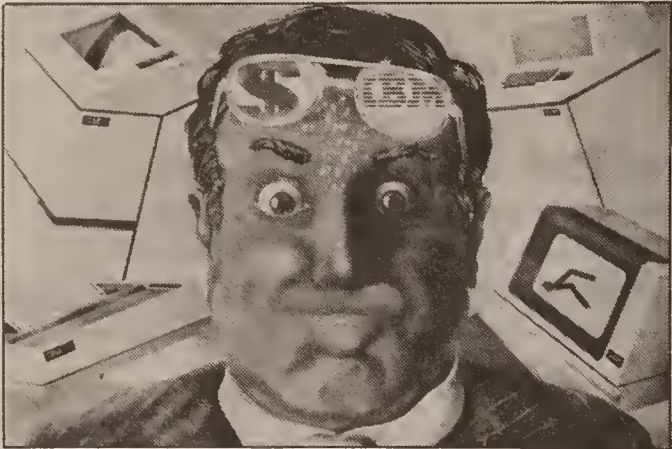


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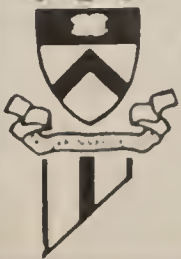
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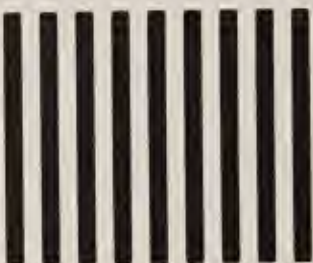
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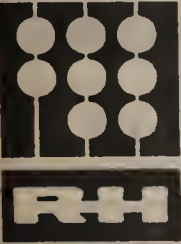
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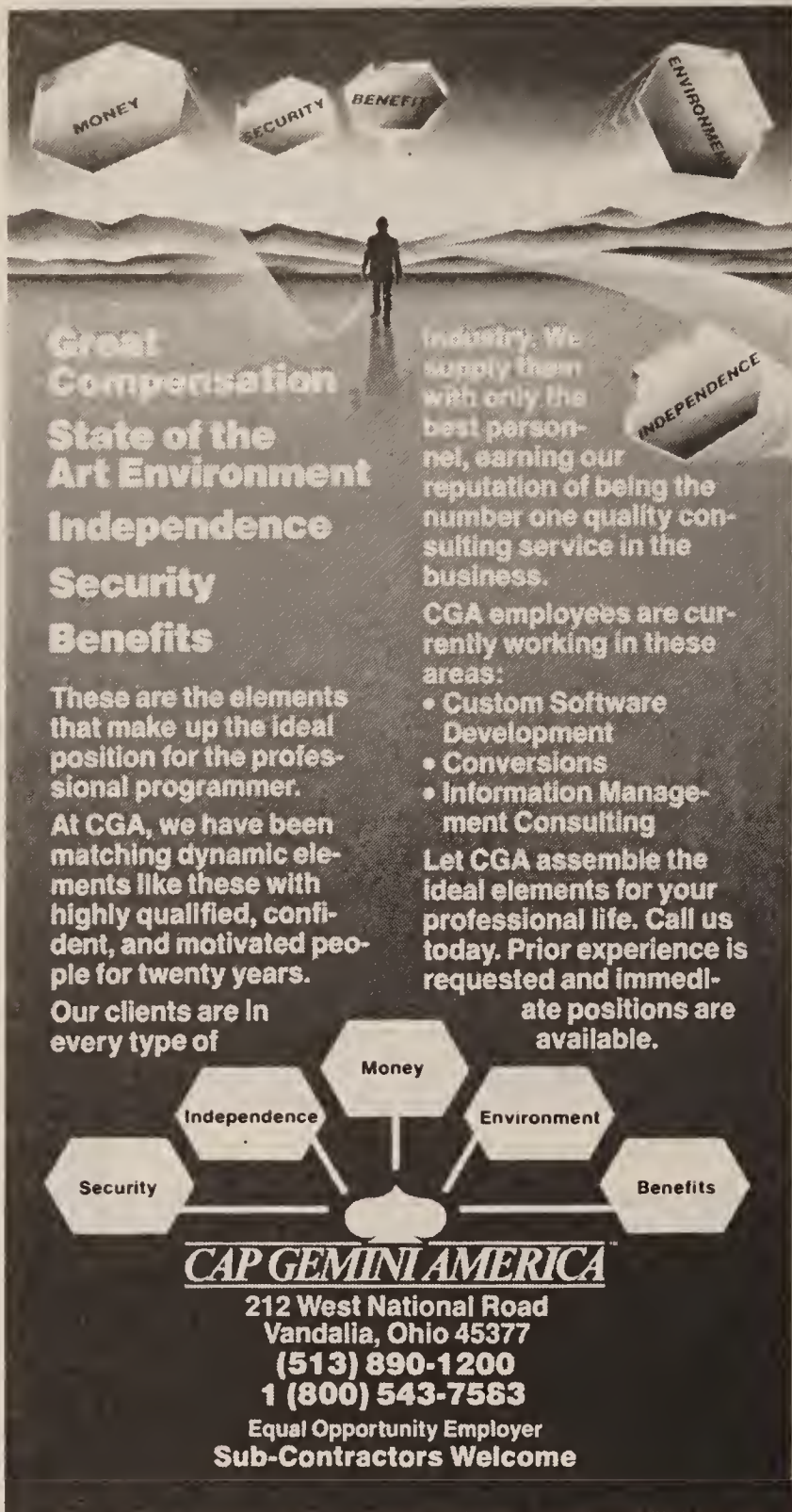
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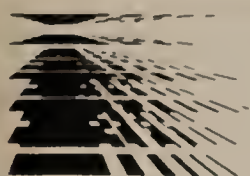
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COMPUTER INDUSTRY

Lotus exec eyes info services

From page 114

nically and otherwise."

In site licensing, each customer may pose a particular requirement, and Lotus is investigating many options. Exxon Corp. and some other companies with well-established communications links between micros and mainframes, for example, are interested in keeping a master 1-2-3 program on a mainframe.

This setup would not require users to access the mainframe every time they wanted to run 1-2-3, Manzi said, jokingly rejecting a scenario in which "8,000 PCs would dial in simultaneously, and IBM would sell a lot of Sierras." Rather, the setup could simplify upgrades and maintenance by allowing firms to download software to the micros at night and install it on hard disk drives.

Lotus also is talking with customers about software delivered on local-area networks, which will become much more crucial over time, Manzi said.

Those discussions have tabled the lock-and-key software protection device that the company was pushing hard a year ago. Lotus does not plan to sell products with a hardware-based antipiracy scheme this year or maybe ever, he said.

Manzi said that installing packages on hard disk drives satisfies most corporate concerns about copy protection. "They're not looking for hardware keys; they never were," he said.

With many customers asking for improved access to data from various sources, Lotus also is pouring resources into its new Information Services organization. "Information Services is now a full-fledged division, with lots on its plate," Manzi said.

One large item on the plate is Symphony Link, the micro-to-mainframe product introduced last year to a disappointing market response. Follow-up data retrieval offerings, with portions running on both micro and mainframe, will be delivered this year. These will incorporate technology from Information Center Software, Inc.'s Ilink software, which Lotus expects to buy shortly.

While Lotus is moving to address

customer concerns, Manzi acknowledged that the company still attracts considerable criticism for perceived arrogance. "We actually have conscious, deliberate discussions on the inside trying to get at the heart of that and to do something about it," he said.

Manzi mentioned service on the customer phone lines as one key complaint. Lotus is working on the problem, but to solve it completely the firm "would need to hire 40 or 50 more people," he said. "We're not prepared to do that."

Lotus drew considerable flak for the way it handled the upgraded 1-2-3 [CW, Dec. 23]. But Manzi claimed that more than 95% of 1-2-3 users were "very satisfied with what we did with the upgrade program and are very satisfied with Release 2."

"In the fourth quarter, Release 2 broke every single figure in the history of micro software, in terms of volume," he said. "There was not a hiccup in the plan as far as meeting our financial objectives for the upgrade. The problem is that some of our customers were upset with us."

In the future, Lotus is likely to give customers more advance warning and to ship existing products for an interim period, he suggested.

The Signal financial data delivery system, whose foundation Lotus acquired along with its purchase of Dataspeed, Inc. last summer, is doing reasonably well, Manzi said. He expressed high hopes for the financial data base access products offered by Isys Corp., whose buy-out was completed last week (see story page 89), and added that Lotus will attempt to integrate those products with Signal by midyear.

Among Lotus' established integrated packages, Manzi said Symphony has just achieved its second-best quarterly sales, while sales of initially delayed Jazz for the Apple Computer, Inc. Macintosh are satisfactory. "Jazz is doing okay," Manzi said. "We are not backing off our investment in Jazz or the Macintosh."

Despite its acquisitions and growth in employment to 1,085 people, Lotus is achieving revenue of \$250,000 per employee, "which is still something that only oil companies get," Manzi concluded. "We've got \$90 million in cash and no debt, which is not too shabby. We had a record quarter. Things are fundamentally sound."

service and of Commercial Credit as collateral.

Geran predicted that Commercial Credit could earn the company \$1.50 per share in 1986, but that may not be enough to offset continued losses in the computer business. "It will be 1987 before the new product flow in the disk drive business will be strong enough to bring the whole operation into sustainable profitability," he said.

"CDC's short-term need is positive cash flow to invest in research and development for supercomputer development and a new generation of disk drives," Geran added.

For the year, CDC's revenue from computer operations fell 3.3% in the fourth quarter to \$981.4 million and dropped less than 1% for the year to \$3.68 billion. In 1984, CDC earned \$5.1 million, or 12 cents per share overall, but lost \$44.5 million on its computer business.

Despite Comdisco profits, investors remain jittery



ACTIVE ISSUES

Kathy Porteus

When a piece of corporate news catches investors by surprise, they often act first and ask questions later.

Such was the case last month when Comdisco, Inc., the largest lessor of computer equipment after IBM Credit Corp., announced that it had filed a lawsuit contesting a potential Internal Revenue Service claim for \$200 million in taxes and interest. Within 24 hours, Comdisco's stock plummeted 24%, or 6½ points, to 20¾. After sliding to 18, Comdisco partially recovered, trading recently at 23½.

Why are investors jittery about a company that just posted stronger than expected first-quarter earnings and that, by many accounts, will continue to chalk up solid profits? According to Crandall Hays, vice-president of research at Robert Baird & Co. in Milwaukee, "everybody was antsy" at the time of Comdisco's announcement, which came the day after the stock market dropped 39 points. Investors acted, Hays says, "before anyone knew what the reasoning was behind the suit."

Analysts who favor Comdisco say they believe the company has a strong case against the IRS. "In the long run, I think the IRS is just going against Comdisco in a very malicious angle toward tax shelters in general," says Bill Short, a vice-president with Kidder, Peabody & Co.

According to Comdisco's supporters, another issue not adequately understood by investors is how tax revision and the elimination of the investment tax credit (ITC) would affect Comdisco. Analysts say such revision should have a limited impact because of Comdisco's large and profitable remarketing business.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

ing business.

"The elimination of ITC increases the value of used equipment," Hays says, "and Comdisco really makes its money on the back end of the business by remarketing used equipment."

In addition to its remarketing revenue, Comdisco's outlook benefits from predictions of 15% to 20% annual growth for the computer leasing industry, IBM's new Sierra mainframe series and the company's value-added services such as disaster recovery.

Earnings estimates for Comdisco's fiscal year ending Sept. 30, 1986, range between \$2.50 and \$2.65 a share. Analysts maintain that, based on these estimates, Comdisco's stock, trading around 23, is currently undervalued.

"Clearly, Comdisco is doing well," says John Keefe, vice-president of research at Drexel Burnham Lambert, Inc. "But what you've got across Wall Street is a dislike for complexity. Leasing companies, even in the best of circumstances, have very complicated accounting, and it's difficult to independently verify exactly how they are doing."

"Also, it doesn't help Comdisco's stock to get raked over the coals by *Barron's* every year or so," observes Short, who directs Kidder, Peabody Leasing Services, a special-purpose subsidiary of Kidder, Peabody.

Barron's, a weekly financial publication, featured an article in October 1983 that criticized Kidder, Peabody's program and questioned the validity of Comdisco's accounting.

The *Barron's* article, which caused a selling spree of Comdisco's stock, remains highly controversial. Some analysts who support Comdisco accuse *Barron's* of "yellow journalism," while *Barron's*, in its Jan. 13 edition, refers to such analysts as "too young to have killed anyone in the stock last time around."

Amid the ongoing dispute, one factor remains unchanged. Investor understanding of Comdisco, Keefe of Drexel Burnham says, "requires a lot of homework and constant monitoring — which a lot of people don't have the time or inclination to do."

CDC records year-end losses

From page 114

"The Commercial Credit loss was surprising, but the magnitude of the computer business losses is mind-boggling," said E. F. Hutton & Co. analyst Michael Geran. "The company is gradually going in the right direction by cutting costs and writing off bad assets, but it is still facing one of the largest restructurings in the annals of the information processing industry."

The agreement with the banks includes extensions of CDC's default waivers on its loans but calls for CDC to pay off its entire U.S. debt by the end of 1986. In addition to selling Ticketron, CDC has pledged the assets of its Arbitron broadcast ratings

INDUSTRY NOTES

Semiconductor orders on the rise

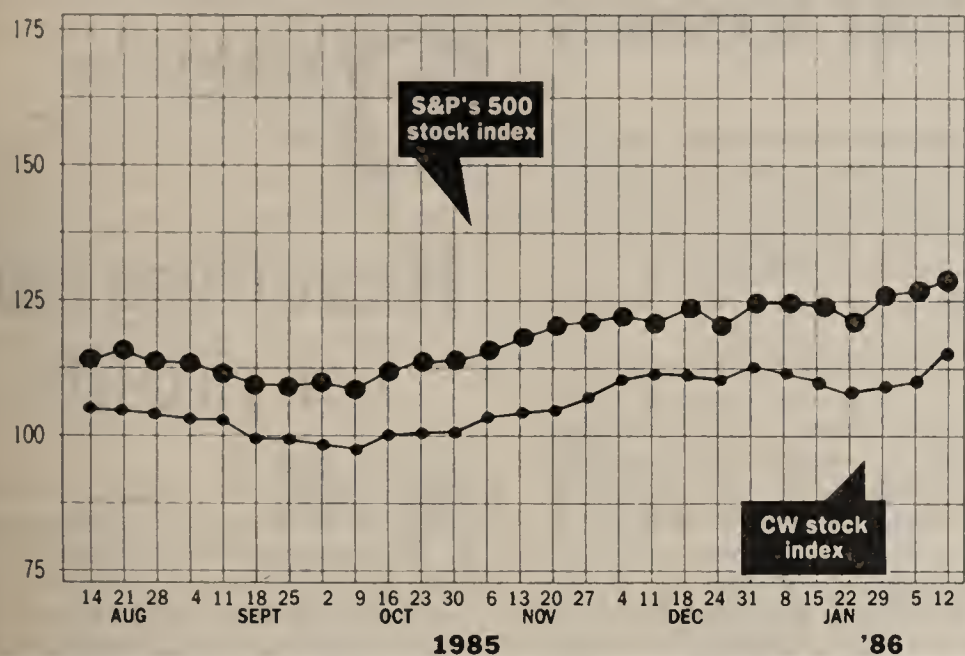
The U.S. semiconductor industry's book-to-bill ratio hit 1.04 in January, the first time in more than a year that the industry posted a higher rate of new orders than of products shipped. . . . **Apple Computer, Inc.** became the 24th member of the **Corporation for Open Systems**, which meets in **Chicago** this **Thursday** to woo members. Apple also announced the resignation of

U.S. marketing head **Michael K. Lorelli**, who will take a top post at Apple boss **John Sculley's** alma mater, **Pepsico, Inc.** . . . **IBM** launched an advertising campaign against gray-market retailers of the **Personal Computer**. . . . **Honeywell, Inc.** averted a strike by 6,500 workers at 22 **Minneapolis-area** plants by signing a two-year contract with **Teamsters Local 1145**.

COMPUTER INDUSTRY

MITCHELL J. HAYES

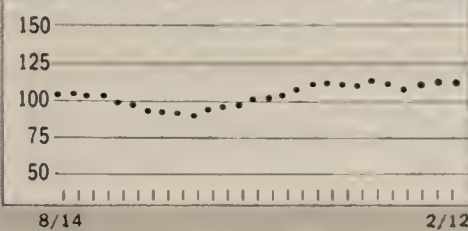
Computerworld stock trading index



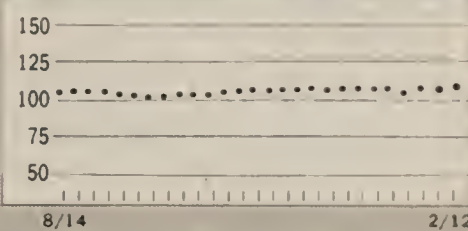
All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	2/5/86	2/12/86
Computer systems	114.3	114.7
Software and DP services	103.6	104.3
Peripherals and subsystems	104.5	108.2
Supplies and accessories	134.0	144.0
Semiconductors	104.7	110.5
Leasing companies	102.9	103.1
CW stock index	110.9	114.7
Standard and Poor's 500 stock index	127.3	129.1

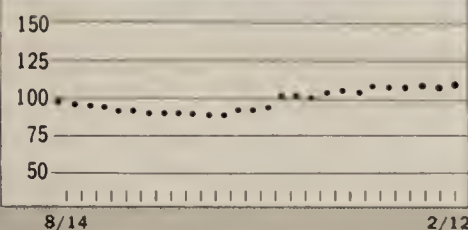
Computer systems



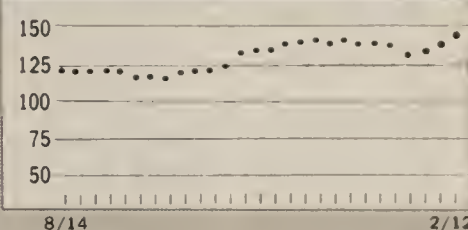
Software and DP services



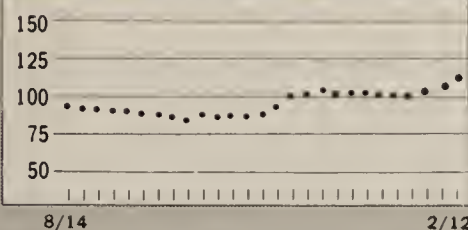
Peripherals and subsystems



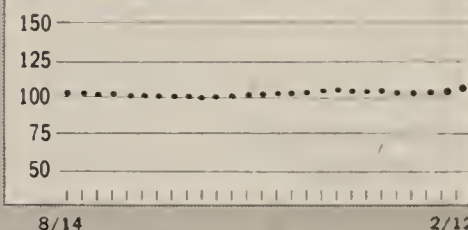
Supplies and accessories



Semiconductors



Leasing companies



Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, FEBRUARY 12, 1986

E X C H		PRICE			
		52-WEEK RANGE (1)	CLOSE FEB 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	5- 9	6 1/4	+1/2	+8.6
O	ALTOS COMPUTER SYST	9- 15	14 7/8	+1 1/2	+11.2
A	AMDAHL CORP	10- 18	14 7/8	-3/4	-4.7
O	APOLLO COMPUTER	9- 31	15 1/4	+3/4	+5.1
O	APPLE COMPUTER INC	14- 31	24	+1/4	+1.0
N	AT&T	19- 28	21 3/8	-1/2	-2.2
N	BURROUGHS CORP	52- 70	67 1/4	-2 3/4	-3.9
O	COMPAQ COMPUTER CP	5- 14	13	+1/8	+0.9
O	COMPUTER AUTOMATION	1- 9	2 5/8	-1/8	-4.5
A	COMPUTER CONSOLES	5- 14	6 1/2	-1/4	-3.7
N	CONTROL DATA CORP	15- 39	22 5/8	+2 5/8	+13.1
O	CONVERGENT TECHNOL	5- 13	11 1/4	-3/4	-6.2
O	CPT CORP	5- 8	6	+1/4	+4.3
N	CRAY RESEARCH INC	25- 71	63 1/8	-1 3/4	-2.6
O	DAISY SYSTEMS CORP	17- 38	19 3/4	+3 1/8	+18.7
N	DATA GENERAL CORP	31- 76	45	+2	+4.6
N	DATAPOINT CORP	5- 22	5 1/8	0	0.0
N	DIGITAL EQUIPMENT	85- 159	158 1/2	+4 1/8	+2.6
A	ECCO INC	13- 16	14 1/4	-1/4	-1.7
N	ELECTRONIC ASSOC.	3- 6	4 3/8	+1/8	+2.9
N	FLOATING POINT SYST	18- 37	33 3/8	-1 3/4	-4.9
N	FOXBORO	22- 31	25 1/2	+1 1/4	+5.1
N	GOULD INC	20- 38	30 1/8	+1 3/8	+4.7
N	HARRIS CORP	22- 35	29	+1/4	+0.8
N	HEWLETT-PACKARD CO	29- 43	43	+2 1/2	+6.1
N	HONEYWELL INC	54- 87	78 5/8	+1/8	+0.1
N	IBM	117- 156	155	+1/8	0.0
O	IPL SYSTEMS INC	1- 4	1 3/4	+3/8	+27.2
N	ITT CORP	28- 42	42	+1 7/8	+4.6
N	M/A-COM INC	13- 24	14 5/8	+7/8	+6.3
N	MANAGEMENT ASSIST	2- 28	2 1/8	+1/8	+6.2
N	MATSUSHITA ELEC(AOR)	49- 71	69 7/8	-1 1/2	-1.5
O	MENTOR GRAPHICS	13- 30	18	-3/4	-4.0
N	MODULAR COMPUTER SYS	6- 8	6 1/2	0	0.0
N	MOHAWK DATA SCI	1- 13	2 1/4	+1/8	+5.8
N	NBI INC	11- 20	11 3/8	+3/8	+3.4
N	NCR	25- 46	45 3/4	+1 1/4	+2.8
N	PERKIN-ELMER	22- 35	34 3/4	+1 5/8	+4.9
N	PRIME COMPUTER INC	15- 27	27	+2 1/8	+8.5
N	SPERRY CORP	39- 59	51	+7/8	+1.7
O	STRATUS COMPUTER INC	9- 25	21 1/2	-1/4	-1.1
O	TANDEM COMPUTERS INC	13- 29	25 1/8	+2 1/2	+11.0
N	TANDY CORP	24- 42	39 1/2	+1/2	+1.2
O	TELEVIDEO SYSTEMS	2- 4	3 5/8	+5/8	+20.8
O	TELXON CORP	10- 24	24	+1/4	+1.0
N	TEXAS INSTRUMENTS	86- 132	119 3/4	+5	+4.3
O	ULTIMATE CORP	8- 28	28	+3/4	+2.7
O	VECTOR GRAPHICS INC	0- 1	1/8	0	0.0
A	WANG LABS "B"	15- 29	18 1/4	-1/4	-1.3
A	WANG LABS "C"	15- 29	18 5/8	0	0.0
N	XEROX CORP	37- 66	65 3/4	+1 3/4	+2.7

SUPPLIES & ACCESSORIES

N	AMERICAN BUS PRODS	21- 35	33	+1	+3.1
N	BARRY WRIGHT	17- 29	19 7/8	+1 1/4	+6.7
A	DUPLEX PRODUCTS INC	13- 22	20 7/8	+1 1/4	+6.3
N	ENNIS BUS. FORMS	14- 26	25 3/4	+3 1/4	+14.4
N	3M COMPANY	74- 96	95 7/8	+2 7/8	+3.0
N	MOORE CORP LTD	15- 22	21 1/2	+1 1/8	+5.5
O	STANDARD REGISTER	22- 39	38 1/2	+3 3/4	+10.7
N	WALLACE COMP SERVICE	30- 45	45	+4	+9.7

E X C H		PRICE			
		52-WEEK RANGE (1)	CLOSE FEB 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	2- 4	4 3/8	+1/4	+6.0
N	ADVANCED SYSTEMS INC	9- 18	18 1/4	+1 3/8	+8.1
N	AGS COMPUTERS INC	10- 24	23 3/8	+1/2	+2.1
O	AMERICAN SOFTWARE	9- 15	9 1/8	+5/8	+7.3
N	ANACOMP INC	2- 4	3 3/4	+3/8	+11.1
O	ANALYSTS INTL CORP	5- 11	5 5/8	+1/8	+2.2
O	ASHTON TATE	6- 23	23 1/8	+2 1/2	+12.1
O	ASK COMPUTER SYSTEMS	7- 25	13 5/8	+1 5/8	+13.5
	ASTRADYNE COMP INC	1- 3	2	0	0.0
N	AUTOMATIC DATA PROC	35- 64	64 1/4	+2 3/8	+3.8
O	COMPUTER NETWORK	5- 9	5 1/4	+1/4	+5.0
O	COMPUTER ASSOC INT'L	18- 37	37	+3	+8.8
O	COMPUTER HORIZONS	5- 11	10 3/8	+1/8	+1.2
N	COMPUTER SCIENCES	13- 34	32 7/8	-7/8	-2.5
O	COMPUTER TASK GROUP	10- 24	24	+3/4	+3.2
O	COMPUTER USAGE	1- 3	1 3/4	+1/8	+7.6
O	COMPUTONE SYSTEMS	4- 11	4 1/4	+1/8	+3.0
O	COMSERV CORP	1- 6	4	+1/2	+14.2
O	COMSHARE	7- 12	10	-5/8	-5.8
N	CULLINET SOFTWARE	13- 33	14 1/4	+1/4	+1.7
O	CYCARRE SYSTEMS INC	19- 27	20 3/4	+1	+5.0
O	HOGAN SYSTEM INC	4- 12	7 5/8	-1/8	-1.6
N	GENERAL ELECTRIC CO	56- 74	72 7/8	-1/8	-0.1
N	GENL MOTORS E (EDS)	20- 47	42	+1 1/4	+3.0
N	GTE CORP	38- 50	49 3/4	+3/4	+1.5
O	INFORMATION SCIENCE	1- 5	3 3/8	+1 1/8	+50.0
O	INFOTRON SYSTEMS CP	13- 24	17 1/4	+1 1/4	+7.8
O	KEANE ASSOCIATES	10- 20	12	+1/4	+2.1
N	LOGICON	25- 43	35 1/8	-1 3/8	-3.7
O	LOTUS DEVELOPMENT CP	15- 34	21 3/4	+1/4	+1.1
O	MCI COMMUNICATIONS	7- 13	13	+5/8	+5.0
O	MNGT SCI AMER INC	7- 16	12 5/8	+1	+8.6
O	MATHEMATICAL APP GRP	1- 8	1 3/4	0	0.0
O	MICOM SYSTEMS INC	12- 35	19 3/4	-1 1/4	-5.9
O	MICROPRO INT'L CP	2- 4	2	-2/9	-2.9
O	NATIONAL DATA CORP	8- 18	18 3/8	+5/8	+3.5
O	ON-LINE SOFTWARE INT	4- 11	10	0	0.0
N	PANSOPHIC SYSTEMS	14- 29	28 1/2	0	0.0
N	PLANNING RESEARCH	11- 19	17	+1 1/4	+7.9
O	POLICY MGMT SYSTS CP	17- 35	17 1/2	0	0.0
O	PROGRAMMING & SYS	4- 9	7 7/8	0	0.0
O	REYNOLDS & REYNOLD	31- 58	57 3/4	+2 1/4	+4.0
O	SEI CORP	13- 26	24 1/4	+1/4	+1.0
O	SHARED MEDICAL SYST	26- 37	36 5/8	0	0.0
O	SCIENTIFIC COMPUTERS	5- 8	5 1/8	0	0.0
O	SOFTWARE AG	12- 22	18 1/2	+1/2	+2.7
N	URS CORP	10- 14	11 3/4	-3/8	-3.0
N	UCCEL	11- 17	17 1/4	+1 5/8	+10.3
O	VM SOFTWARE	17- 24	21 1/4	+1/4	+1.1

SEMICONDUCTORS

N	ADVANCED MICRO DEV	22- 36	31 3/4	+2 7/8	+9.9
O	ADV'D SEMICONDUCTOR	7- 23	11 1/4	+2	+21.6
N	ANALOG DEVICES INC	18- 30	29 3/4	+3 3/8	+12.7
O	ANALOGIC CORP	11- 16	14 3/4	+1/4	+1.7
N	APPLIED MAGNETICS CP	9- 17	16 5/8	-1/8	-0.7
O	AVANTEK	18- 26	18 3/8	+3/4	+4.2
O	HADCO CORP	3- 7	5	-1/4	-4.7
O	INTEL CORP	21- 33	28 3/4	-3 1/4	-10.1
O	MICRO MASK INC	6- 12	6 3/4	+1/4	+3.8
N	MOTOROLA INC	29- 45	44 5/8	+2 3/8	+5.6
N	NAT'L SEMICONDUCTOR	10- 15	14 1/8	+1/2	+3.6
N	TERADYNE	17- 33	26 5/8	+4 1/4	+18.9

PERIPHERALS & SUBSYSTEMS

		52-WEEK RANGE (1)	CLOSE FEB 12 1986	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	3- 7	6 1/2	+5/8	+10.6
A	ANDERSON JACOBSON	2- 5	2	0	0.0
O	AST RESEARCH INC	7- 33	26 1/4	+1 3/4	+7.1
O	AUTO-TROL TECHNOLOGY	3- 13	4 1/8	-3/8	-8.3
O	AVANT-GARDE COMPUTNG	3- 21	5	-1/4	-4.7
O	BANCTEC INC	6- 12	8 1/2	+3/8	+4.6
O	BEEHIVE INT'L	1- 2	1/4	+1/8	+100.0
N	BOLT, BERANEK & NEW	20- 37	35 7/8	+1/2	+1.4
N	CAMBEX CORP	1- 3	1 1/4	0	0.0
N	CENTRONICS DATA COMP	3- 11	4 5/8	-1/8	-2.6
A	CETEC CORP	6- 9	7 1/2	+1/4	+3.4
A	COGNITRONICS	4- 7	4	+1/4	+6.6
N	COMPUGRAPHIC CORP	23- 36	22 7/8	+3/8	+1.6
O	COMPUTER TRANSCIVER	0- 1	3/8	0	0.0
N	COMPUTERVISION CORP	9- 44	12 7/8	+1/2	+4.0
N	CONRAC CORP	12- 17	17 3/8	+3/8	+2.2
A	DATAPRODUCTS CORP	11- 20	14	-1 1/8	-7.4
A	DATARAM CORP	4- 11	10 5/8	+1 1/2	+16.4
O	DATA SWITCH CORP	4- 9	6	+1/2	+9.0
O	DATUM INC	5- 9	5 1/4	-1/8	-2.3
O	DECISION DATA COMPUT	10- 20	11 1/8	-3/4	-6.3
O	ENDATA, INC	2- 8	4 1/2	-3/8	-7.6
O	EVANS & SUTHERLAND	12- 22	21 5/8	+1/2	+2.3
O	GANDALF TECHNOLOGIES	5- 13	6 1/2	-1/8	-1.8
N	GEN'L DATA COMM IND	8- 21	11	+1/2	+4.7
N	HAZELTINE CORP	20- 30	20 1/4	-1/2	-2.4
O	ICOT CORP	3- 10	9 3/8	-1/8	-1.3
O	INFORMATION INTL INC	10- 17	13 1/4	-1/4	-1.8
O	INTECOM INC	4- 11	4 1/8	0	0.0
A	LUNDY ELECTRONICS	10- 15	14 1/2	+5/8	+4.5
O	MEGADATA CORP	3- 8	3 3/4	0	0.0
A	MSI DATA CORP	7- 13	10 3/4	+1/2	+4.8
N	NASHUA CORP	24- 39	38 1/2	+3 1/2	+10.0
O	NETWORK SYSTEMS CORP	14- 27	14 1/8	-1/2	-3.4
N	NO AMERICAN PHILIPS	32- 45	40 7/8	+2 1/4	+5.8
N	NORTHERN TELECOM LTD	26- 41	27 3/4	+2 1/8	+8.2
O	OMEX	1- 3	3/8	-1/8	-25.0
N	PARADYNE CORP	6- 18	7	+7/8	+14.2
A	PENRIL CORP	7- 14	8 1/8	+1/8	+1.5
N	PLESSEY CO (ADR)	19- 28	26	+2 1/8	+8.9
O	PRINTRONIX INC	9- 18	12 3/4	+7/8	+7.3
O	QMS INC	6- 16	11 3/8	+1/8	+1.1
O	RAMTEK CORP	2- 7	3 1/4	+1/4	+8.3
N	RECOGNITION EQUIP	9- 17	14 1/4	-1	-6.5
N	SANDERS ASSOCIATES	30- 44	36	0	0.0
O	SCAN-TRON CORP	9- 17	16 3/4	-1/2	-2.8
N	SCIENTIFIC ATLANTA	10- 15	12 5/8	+7/8	+7.4
O	SEAGATE TECHNOLOGY	5- 9	9 3/8	+1	+11.9
N	STORAGE TECHNOLOGY	1- 4	3 1/2	-1/4	-6.6
O	SYKES DATATRONICS	0- 2	1/8	0	+16.4
A	T BAR INC	5- 9	5 5/8	+1/8	+2.2
A	TAB PRODUCTS CO	14- 21	19 1/2	+7/8	+4.6
O	TANDON CORP	3- 9	5 1/8	+1 1/8	+28.1
A	TEC INC	6- 13	5 3/4	0	0.0
N	TEKTRONIX INC	47- 68	63 5/8	+4 5/8	+7.8
N	TELEX	34- 64	63 1/8	+5/0	+1.0
O	TESDATA SYSTEMS CP	0- 3	7/8	-1/8	-12.5
N	TIMEPLEX INC	15- 23	15 1/2	+5/8	+4.2
N	TITAN CORP	4- 11	11 1/4	-1/8	-1.0
O	VISUAL TECHNOLOGY	1- 3	3/4	0	0.0

COMPUTER INDUSTRY

INSIDE

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Eagle inks another deal in an effort to stay afloat/**90**

IBM shuffles its Information Systems Group executive lineup/**92**

Comdisco ranks high with analysts who say jittery investors don't understand the issues facing the leasing firm/**112**

INSTANT ANALYSIS

"Going public is about as interesting as getting a bank loan."

— Larry Ellison, president, Oracle Corp., on the Belmont, Calif., software firm's initial public offering

CDC posts year-end losses

Agreement with creditors includes sale of Ticketron

By Clinton Wilder

MINNEAPOLIS — Ending the worst financial year in history by any major mainframe vendor, Control Data Corp. last week reported a larger than expected loss of \$567.5 million, or \$14.56 per share, for the 12 months ended Dec. 31. The deficit was increased by a fourth-quarter loss of \$297.9 million, or \$7.32 per share, which included a loss by CDC's formerly profitable financial services unit, Commercial Credit Co.

CDC did offer its shareholders and customers some optimistic news, however, as it announced a preliminary agreement with its creditor banks on repayment of its \$380 million U.S. debt. The agreement, which includes the anticipated first-quarter sale of CDC's Ticketron unit for an estimated \$200 million, should prevent CDC from having to seek credit protection under Chapter 11 of the Federal Bankruptcy Code.

Separately, Burroughs Corp. announced a new round of 900 layoffs in its ongoing

effort to streamline operations. The cutbacks stem from the closing or consolidation of five Burroughs plants in the U.S. and one in Scotland and will bring the total number of worldwide employees cut by Burroughs since January 1985 to approximately 3,500.

CDC's huge fourth-quarter loss included a \$121 million write-down, mostly on its beleaguered peripheral equipment business. The firm is currently restructuring its storage business to concentrate on high-end peripherals after selling off or discontinuing many of its commodity disk and tape product lines in 1985.

CDC's 1985 loss ranks with some of the worst U.S. business deficits in recent years. Pharmaceutical maker A. H. Robins Co. led the Fortune 500 manufacturers in 1984 with a \$461.6 million loss, although financial service firms Continental Illinois Corp., with \$1.08 billion, and Financial Corporation of America, with \$590.5 million, recorded higher losses in 1984.

CDC's Commercial Credit unit lost \$30.4 million in the quarter to finish \$4.8 million in the red for the year, due to a one-time charge for a write-down of its property and casualty insurance business.

See **CDC** page 112

Sequent wins parallel processing gamble, offers Balance 21000

By Maura McEnaney

BEAVERTON, Ore. — When Scott Gibson left his position as general manager of Intel Corp.'s memory components operation to cofound Sequent Computer Systems, Inc. three years ago, he misjudged the market he was about to enter. But the call turned out to be a good one for the manufacturer of multiprocessing systems.

"We incorrectly assessed the parallel processing market," according to Gibson, Sequent's chief operating officer. "At first we thought it would be somewhat nonexistent and that there would be zero payback for a long time, but we were wrong."

Based on just that error, gears are shifting at Sequent today. After a year of shipping its Balance 8000 multiprocessor run-

ning Unix operating systems, Sequent is poised to capitalize on what it believes is a growing acceptance of parallel processing technology. With year-end sales of about \$5 million, Gibson said, "We are entering a profitable phase."

Sequent is one of the first vendors to bring a multiprocessor with parallel processing capabilities into the market. The majority of its 46 installations today, however, employ only the 8000's multiprocessing functions.

Recently the company introduced the Balance 21000, featuring up to 30 processors and reportedly handling up to about 256 users.

But because of the burgeoning interest

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INDUSTRY INSIGHT
Clinton Wilder

Reaching out for profits

AT&T has two main problems these days: earning strong profits and quelling acquisition rumors. Alas, the two are not unrelated.

As the first major snowfall of the winter lashed into AT&T's corporate homeland of New York and northern New Jersey on Friday, Feb. 7, the firm was busy fending off storms on two other fronts. First, Moody's Investors Service, Inc. made good on last fall's threat by downgrading its debt ratings on some classes of AT&T's bonds and preferred stock. Then, AT&T's public relations staff spent much of the day issuing denials that the company was about to merge with Digital Equipment Corp.

Granted, all industry followers know that the AT&T about-to-buy-a-computer-vendor rumor has had more comebacks than Charles Bronson. Even DEC public relations boss Joe Nahil apparently had to stifle a yawn when he issued the statement, "It's just a rehash of the same rumor that's been around for years." And An Wang, head of last year's rumored AT&T acquisition candidate, insisted again in a recent conversation with *Computerworld* that there has never been any reach-out-and-touch communication between the two companies.

So how do these rumors get started?

The clue lies in the aforementioned action of Moody's or, more accurately, in the news that precipitated that action — AT&T's fourth-quarter and year-end financial results [CW, Feb. 3]. The divested telephone monolith's fiscal performance continues to lag behind

See **AT&T** page 89

Wilder is CW's senior editor of industry.

Lotus head emphasizes installed base during push into information services

By Eric Bender

CAMBRIDGE, Mass. — Lotus Development Corp. must remember to stay close to its installed base of 1.5 million users as it intensifies the drive into information services, according to Lotus President Jim Manzi.

"Anything we've done with acquisitions really revolves around the universe that we've helped to establish with 1-2-3 and Symphony," Manzi said in a recent interview at Lotus headquarters.

To satisfy the large-corporation

portion of that universe, the micro-computer software star must handle a host of very tricky and evolving issues such as site licensing, Manzi observed.



Jim Manzi, president of Lotus

"Companies want to plan, and that's extraordinarily legitimate, and we have to be extraordinarily responsive to that," he said. "If Lotus doesn't have an answer, everybody forgets that nobody else has an answer either. We're going to have to do a lot on our own timetable because so much

is incredibly complicated, both tech-

See **LOTUS** page 112

Exec departs as loss reported

Vice-chairman to man Computervision's helm

By Rosemary Hamilton

BEDFORD, Mass. — In sharp contrast to its record-breaking operations in 1984, Computervision Corp. last week reported an \$80.8 million loss, or \$2.82 per share, on revenue of \$441.1 million for the year ended Dec. 31. The poor showing came on the heels of the announcement that James Berrett, president and chief executive officer, had resigned. Robert Gable, who was vice-chairman and chief operating officer, immediately replaced him.

The year-end results held no sur-

prises, since Computervision had been losing market share, laying off hundreds and reorganizing its business throughout 1985. In the fourth quarter ended Dec. 31, the company reported a loss of \$21.8 million, or 76 cents per share — its fourth consecutive quarterly loss. Fourth-quarter revenue of \$117.2 million was down 28% from the same quarter a year ago, when the company reported revenue of \$163.9 million and net income of \$14.9 million.

Gable would not speak to the press about his new position or the status of Computervision. But a spokesman said that Berrett's departure should have little impact, because "Gable had been running the company any-

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